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WOOD'S MEDICAL AND SURGICAL MONOGRAPHS

CONTENTS

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BY JOHN BROWN, M.D.

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BY A. SYMONS ECCLES, M.B.

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BY THOMAS BRYANT, F.R.C.S.

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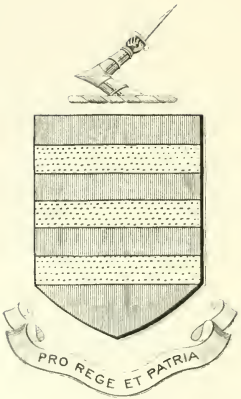

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The Influence of the Male Element

UPON THE

FEMALE ORGANISM,

OVER AND ABOVE ITS FERTILIZING INFLUENCE UPON THE OVUM.

BY

JOHN BROWN, M.D.,

GLASGOW, SCOTLAND.

THE INFLUENCE OF THE MALE ELEMENT UPON THE FEMALE ORGANISM.[1]

THE subject of this paper is rather outside the category of this Society, and is unsatisfactory so far as it has no claim to be practical. It is one on which Alexander Harvey, of Aberdeen, has at various times written, and his essays have quite recently been published in book form. The late Charles Darwin, in his work on the "Variations of Animals and Plants under Domestication," has a great deal to say on this subject. In that work he speaks of the principle of inheritance, and refers to the great variability of this inheritance, due to the immense number of causes, known and unknown, which act and react upon the organism during its various stages of life. The influence of the male element upon the female organism, over and above its fertilizing influence upon the ovum, he considers an important cause in the variation of inheritance. Darwin has given proofs of this influence in both vegetable and animal life, but Harvey has limited his proof to the higher animals and man. He, however, believes that pathological qualities may be transmitted in this way, and has brought forward evidence in support of that view. Harvey and Darwin do not agree regarding the route of transmission of this influence, but this will become more evident as we proceed. The major portion of this evidence has been taken from these two authors.

First, as regards the evidence from vegetable life, Sachs, in his recent work on botany, says: "The process of development brought about by fertilization, or the union of the reproduc-

tive cells, is usually not confined to the resulting embryo, but shows itself also in a variety of changes in the mother plant itself;" and he gives various examples. He says, "In phanerogams the entire development of the seed and fruit depends upon the changes caused in the mother plant by the fertilization of the embryonic vesicles. In the *orchidaceæ* the action of the pollen tube is visible on the mother plant even before fertilization. Hildebrand has shown that in all orchids that he examined the ovules were not in a condition to be fertilized at the time of pollination, and in some, as *Dendrobium nobile,* they have not even begun to be formed. In the orchidaceæ the formation of the female cell is therefore a result of pollination. It is determined by the action of the male pollen tube on the tissue of the mother plant."

Darwin has also given a good many instances to show this influence of the male element upon the mother form. He says that in plants the ovarium and the coats of the ovules are obviously parts of the female, and he gives evidence to show that these are affected by foreign pollen. "It was observed," he says, "as long ago as 1729 that white and blue varieties of the pea when planted near each other, mutually crossed, no doubt through the agency of bees, and in the autumn blue and white peas were found within the same pods. It has been conclusively proved since, by the experiments of Gaertner and J. M. Berkeley, that the color of the skin of the pea is modified when pollen of a differently colored variety is used."

He quotes also the case of the tall sugar pea, which bears very thin green pods, but when fertilized with pollen of the purple-podded pea it yields a pod clouded with purplish red. The color lies in the outer of the two coats which surround the pea.

Further, he proceeds to show that this influence may extend also to the ovarium and fruit. "Gallesia," he says, "impregnated an orange with pollen from a lemon, and the fruit borne on the mother tree had a raised stripe of peel like that of a lemon, both in color and taste, but the pulp was like that of an orange, and included only imperfect seeds."

"M. Naudin," he says, "states that he has seen fruit growing on *chæmærops humilis* which had been fertilized by M. Denis with pollen from the *phœnix* or date palm. The fruit or drupe thus produced was twice larger and more elongated

than that proper to the *chæmœrops*, so that it was intermediate in these respects as well as in texture between the fruit of the two parents. These hybridized seeds germinated and produced young plants likewise intermediate in character."

He then gives similar cases among the *cucurbitaceæ*, grapes, maize, and apple.

Now, it is has been shown in these cases that the influence of the male element represented by foreign pollen caused the production, in some cases, of imperfect seeds, in others of perfect seeds, leading in the case of the perfect seeds to the development of hybrid plants. But over and above this influence, it exerted another over parts purely maternal, and having nothing to do with the embryo, such as the seed coats of the pea, and the various fruits mentioned.

But it has to be noted that in the cases given the changes produced in the maternal parts were due to fertilization by foreign pollen. When pollen from the same species is the fertilizing medium, we get what is an ordinary event in nature, the seed or fruit shows no divergence from what is usual to the plant. There is an attempt by nature in both cases to incorporate the qualities of both male and female elements. When foreign pollen is used we have divergent results in the seed or fruit, because there is an attempt for each element to be represented in the product, and the degree of representation depends upon whether the one or the other is prepotent.

What pollen of the same species is used, where male and female attributes coincide, there is no evidence that the male element has any influence over purely maternal parts; but may we not naturally conclude that there is such an influence by analogy from these cases where foreign pollen is used? To deny this, we must believe that foreign pollen has an influence which is denied to pollen of the same species.

Regarding the extent of this influence in plants, Darwin says that while foreign pollen may cause the coats of the seeds and the ovarium or fruit, and even the calyx and upper part of the peduncle of the mother plant, to be modified, yet he has no reason to believe that this influence extends any further into the plant. There is not the least reason to believe, he says, that a branch which has borne seed or fruit directly modified by foreign pollen, is itself affected so as subsequently to produce modified buds. Such an occurrence, from

the temporary connection of the flower with the stem, would be hardly possible.

But it may be asked—if there is no reason to believe that the tree itself, or even the branch, is modified when the flower produced upon it has been fertilized by foreign pollen, on account of the temporary connection of the flower with the stem, would a modification not be expected in other and higher organisms from a similar influence where the ovarium is not temporary but permanent?

Darwin has given cases to show that a variety, when grafted or budded on another variety, sometimes affects the whole stalk, or at the point of junction gives rise to a bud or graft hybrid which partakes of the characters of both stock and scion. For instance, when the variegated jasmine is budded in the common kind, the stock sometimes produces buds bearing variegated leaves. This has also been seen in the oleander. Some buds of a golden variegated ash, which were inserted into common ashes, all died except one; but the ash stocks were affected, and produced—both above and below the points of insertion of the plates of bark bearing the dead buds—shoots which bore variegated leaves. Buds taken from an ash tree with yellow leaves were inserted into common ashes, which in consequence were affected, and produced the blotched Breadalbane ash.

These cases most undoubtedly show that grafts exercise an influence upon the mother stock, probably of the same nature as the influence of the male element upon parts maternal—proceding, however, in the case of grafts, to exercise that influence to a wider extent, on account of their more permanent connection with the mother plant.

Now, as regards the evidence from animal life. That evidence may be shown in the transmission of physiological and pathological qualities; and, first, as regards the physiological qualities.

In the "Philosophical Transactions" for 1821 two cases are recorded which have been quoted both by Dr. Harvey and Darwin. They are as follows:

A nearly pure bred Arabian chestnut mare bore a hybrid to a quagga; she was subsequently sent to Sir Gore Ouseley, and produced two colts by a black Arabian horse. These colts were partially dun-colored, and were striped on the legs

more plainly than the real hybrid, or even than the quagga. One of the two colts had its neck and some other parts of its body plainly marked with stripes. Stripes on the body, not to mention those on the legs, and the dun-color are extremely rare with horses of all kinds in Europe, and are unknown in the case of Arabians. But what makes the case still more striking is, that the hair of the mane in these colts resembled that of the quagga, being short, stiff, and upright. Hence there can be no doubt that the quagga affected the character of the offspring subsequently begot by the black Arabian horse. A sow of the black and white breed (known as Mr. Western's breed) became pregnant of a boar of the wild breed, of a deep chestnut color. The pigs produced were duly mixed, the color of the boar being in some very predominant. The sow being afterward put to a boar of the same breed with her own, some of the produce were observed to be stained or marked with the chestnut color that prevailed with the former litter; and on a subsequent impregnation, the boar being still of the same breed as the sow, some of the litter were also slightly marked with the chestnut color.

Other cases are given by Dr. Harvey which need not be repeated, as they resemble the previous two cases. The following two cases occurred in the human species, and are also from Dr. Harvey's work.

Mrs. —— was twice married, and had issue by both husbands. The children of the first marriage were five in number, of the second, three. One of these three (a daughter) bears an unmistakable resemblance to her mother's first husband. What makes the likeness the more discernible is that there was the most marked difference in their features and general appearance between the two husbands.

Professor J. Y. Simpson communicated to Dr. Harvey the following case: A young woman, born of white parents, but whose mother some time before her marriage had a bastard child (a mulatto), by a negro man-servant in Edinburgh. She presented distinct traces of the negro. Dr. Simpson had no recent opportunities of satisfying himself as to the precise extent to which the negro character prevails in her features, but he recollects being struck with the resemblance, and noticed particularly that the hair had the qualities characteristic of the negro.

Dr. Harvey says these facts were well known to our great breeders of cattle, dog fanciers, etc., and also to the Arabians. Darwin mentions, in a footnote, that a French poet, Jacques Savary, who wrote in 1665 on dogs, was also aware of it. Beeker, in 1703, seems also to have been aware of it, and accounted for it as being due to maternal impression. "When a mare," he says, "has had a mule by an ass and afterward a foal by a horse, there are evidently marks in the foal of the mother having retained some idea of her former paramour, the ass." Haller was also acquainted with a similar case, but accounts for it by a permanent impression made by the semen of the male on the genitals, and more particularly upon the ova of the female. This theory was adopted by many physiologists.

The influence of the male element in these cases has been compared to what is seen in birds, where a single intercourse is known to impregnate many eggs which are laid successively after it, or among the aphis, where the production of young by the female goes on for several generations without any sexual intercourse after that which gave rise to the first. Sir Everard Home, in discussing the cases reported in the "Philosophical Transactions" for 1821, believed them to be due to an abiding influence exerted by the male on the imagination of the female, and operating on her mind at the time of her connection subsequently with other males, and perhaps during her pregnancy. He further seems to have satisfied himself of the existence of nerves in the placenta, and that there was a nervous connection between mother and fœtus through the umbilical cord. This discovery has not been corroborated by succeding observers.

Dr. Alexander Harvey, of Aberdeen, adopted the theory of Mr. James M'Gilvray, a veterinary surgeon of Huntly, and quoted from the "Aberdeen Journal" of 21st and 28th March, 1849. This theory Dr. Harvey has named that of "fœtal inoculation." He believes that the effect is due first to the influence of the male on the ovum, which, in consequence of the subsequent close attachment and freely intercommunicating blood-vessels between the modified embryo and the mother, inoculates the constitution of the mother with the qualities of the male, and so on a subsequent impregnation by another male, the offspring resembles the first male, and not its real parent. He even goes further, and says that it is conceivable,

by each successive impregnation effected by him, that influence may be increased, and if so, the younger children begotten by him, rather than the elder, might be expected, *cæteris paribus*, to bear their father's image, and as regards the mother he suggests the question as to whether there is not something in the popular notion that in the course of years a woman comes to resemble her husband, and that not merely in respect of temper, disposition, or habits of thought, but in bodily appearance, which may be referable to this influence exerted by the husband through the medium of the several fœtuses *in utero* on her constitution.

Darwin, on the other hand, considers it a most improbable hypothesis that the mere blood of one individual should affect the reproductive organs of another individual in such a manner as to modify the subsequent offspring. The analogy, he says, from the direct action of foreign pollen on the ovarium and seed coats of the mother plant strongly supports the belief that the male element acts directly on the reproductive organs of the female, and not through the intervention of the crossed embryo. But, at the same time, while having a preference for this explanation, he says, if the influence be admitted as passing through the fœtus, the case would become one of graft-hybridism, for the fertilized embryo and the mother plant must be looked upon as distinct individuals. The only difficulty here seems to be that in plants the ovum or seed is inclosed in the ovary, and, therefore, the action of the pollen may affect both; but it is difficult to account for the male elements affecting the ovarium of animals when impregnation is supposed to take place most frequently in the oviduct (Fallopian tube), and only occasionally in the ovary itself.

We now come to the pathological proof. By this is meant that if physiological qualities may be capable of transmission, disease may also be conveyed by the same route. Dr. Harvey believes that scrofula and phthisis may be transmitted in this way, but on account of the extreme prevalence of these diseases, and their transmission by ordinary inheritance, it would be difficult of proof. He considers, however, that in syphilis we have the necessary proofs.

He quotes Dr. Ramsbotham in the "Medical Gazette," 23d May, 1835. "It is a generally received opinion, I believe, that

syphilis in its secondary stage is not communicable directly to either sex from the other, that the disease is not propagated unless there exist an open chancre, and this accords with my observation. But it appears to me probable that if a previously healthy woman conceive of an ovum tainted by syphilitic virus derived from its father, her system may become inoculated during the progress of gestation, in consequence of the close vascular connection existing between it and herself, for it has fallen to my lot to see more than one case in which a young woman united to a man laboring under obstinate secondary symptoms remained healthy for some months after marriage, but became the subject of the same disease in its secondary form soon after impregnation had taken place, and I have considered that in such a case the mother derived the disease not directly from the father, but from the affected infant which she carried in her womb."

In 1837 Abraham Colles, of Dublin, announced to the profession a fact he had long noticed, but could not explain—viz., that when a mother acquires syphilis by blood contagion from the fœtus, she thereby gains an immunity, and does not suffer herself from any severe form of the disease; indeed, she may be without any obvious venereal symptoms. He further said he had never seen or heard of a single instance in which a syphilitic infant (although its mouth be ulcerated), suckled by its own mother, had produced ulceration of her breasts; whereas very few instances have occurred where a syphilitic infant had not infected a strange hired wet-nurse and who had been previously in good health. This shows most decidedly that the mother is proteced from syphilitic infection. Jonathan Hutchinson has termed this "Colles' law."

Dr. Montgomery, of Dublin, in 1837 wrote, "Is it possible that a morbid taint—such as that of syphilis, for instance—having been once communicated to the system of the female, may long linger there, and, influencing several ova, continue to manifest itself in the offspring of subsequent conceptions when impregnation has been effected by a perfectly healthy man, and the system of the mother appearing to be at the time, and for a considerable period previously, quite free from the disease?" His reply is, "My belief is certainly in favor of the affirmative;" and, writing in 1856, he says, "Further experience and observation have, I think, shown to be fact what

I could then only venture to say I believed to be likely." Dr. Montgomery quotes the following case from M. Vidal: "A woman, whose husband was affected with constitutional syphilis, gave birth to a child, which in two months showed symptoms of that disease, of which it died. The woman never had any appearance of syphilitic affection, not even to soil her linen. Her husband died, and after remaining some time a widow, she married a healthy man, and about twenty months afterward (being four years after the former birth) she bore a child, which in two months presented the same form of syphilitic eruption which had appeared in the former child."

Dr. Montgomery has more to say on this subject. He says: "I wish to notice a fact the observation of which I thought was original with me, but I now find it was made long ago by others. It may be thus stated: A woman is married to a man who has latent constitutional syphilis by which she is infected, but will show no symptom of the contamination until she conceives and perhaps miscarries, and then the taint is manifested by the development of secondary symptoms in the course of a few weeks, as if the infection was at first communicated and confined to the product of the ovary, and the general system became thence contaminated. Or perhaps another explanation may equally apply, and we may suppose that the new condition and altered action of the generative apparatus had the power of rousing up and rendering active the latent poison lurking and dormant in the woman's system, as we see occasionally happen in patients constitutionally disposed to phthisis. Whichever of these explanations may be nearest the truth, there can be no doubt of the frequent occurrence of the fact."

M. Ricord says: "So long as a diseased father is under the influence of constitutional syphilis, the germ which is by him conveyed into the uterus carries along with it the syphilitic diathesis. . . . There is no such thing as an infection of the child by the mother, she having been contaminated by the father, but the husband procreates an infected child, which may then propagate the secondary poison to the mother—for where there are no children the mother does not suffer."

Dr. Carpenter says, anent the inoculation theory: "This idea is borne out by a great number of important facts, and it serves to explain the circumstance, well known to practi-

tioners, that secondary syphilis will often appear in a female during gestation, or after parturition, who has never had primary symptoms, whilst the father of the child shows no recent syphilitic disorder."

Dr. Tyler Smith says "that the most common mode in which women become affected with syphilitic uterine disorder is that in which the fœtus is the medium of communication;" and, further, he had observed in such cases that at each pregnancy a fresh dose of the syphilitic poison is imparted to the mother, unless in the mean time the husband has been the subject of antisyphilitic treatment.

Jonathan Hutchinson, in the "Medical Times and Gazette," 1856–57, published a paper on this subject, in which he gives a series of cases to show that a pregnant woman may become infected through a syphilitic fœtus—that is to say, without any primary chancre. This infection, he says, had been hitherto supposed to be due to the direct contagion of secondary syphilis. Further, that this form of syphilis is much milder than chancre syphilis; so mild, indeed, as to be without any evident symptoms other than the protection it affords to the mother when suckling her syphilitic child. He compares it to the milder form of small-pox which is communicated by inoculation, and the more serious disease when transmitted aerially. In 1876, in the same journal, he had another paper on the same subject. He corrobates Colles' law, and considers the protection due to a latent form of syphilis. As regards a woman who has given birth to a syphilitic child, but has never exhibited any symptoms herself, should she afterward get married to a husband quite free of syphilis and have children, the question as to whether these would exhibit syphilitic symptoms he confesses he cannot answer without more proof. In his more recent work on syphilis (1887), he says that it is obviously possible that the child would be syphilitic, but no facts have as yet proved it.

The most of the authors quoted are from Dr. Alexander Harvey's work, but they do not go the whole way to prove his theory. Dr. Ramsbotham speaks only of infection of the mother through the fœtus, and says nothing of subsequent children by a healthy husband. Colles' law goes no further. The same is to be said of the evidence of Ricord, Carpenter, and Tyler Smith. Jonathan Hutchinson considers it possible,

but not proven. The only complete evidence is that of Montgomery and the case he quotes from M. Vidal. Alfred Cooper, in his recent work on syphilis and pseudo-syphilis, seems to be in favor of Dr. Harvey's theory, but gives no reasons for his belief.

There is one most important authority who argues against this view. R. W. Taylor, of New York, does not believe that disease can be transmitted from the fœtus to the mother, and he quotes in his favor Kassowitz, Bärensprung, and Pick. He says that the disease may be transmitted from the mother to the ovum, and from the father to the ovum by fertilization, but not otherwise. He denies that syphilis can be conveyed through the utero-placental circulation, which, of course, means that it cannot pass either from the fœtus to the mother, or from the mother to the fœtus. Experiments, he says, have conclusively proved that the essential vehicles of the specific virus are cells or albuminoid molecules derived from an active syphilitic lesion, but after fecundation the embryo is not supplied with cells of any kind, but simply with serum. He believes that there are many cases of women who have given birth to syphilitic children, and yet they themselves remain free of syphilis, because the disease was acquired by the children direct from the father. He admits, however, that on this question he is in the minority, and that the opposite view is more generally believed in. As regards Colles' law, he says that the escape of the mother is due to some occult indiscernible change in her system.

It has always been admitted that there is a communication between mother and fœtus, or otherwise the nutrition of the fœtus could not be carried on. As to whether there is any return of material from fœtus to mother was not clearly made out, until the experiments of W. S. Savory were published in the "Lancet" in 1858. Previous to this, however, there had been some negative experiments of Majendie and Williams, of Liverpool; and Allison in his "Outlines of Physiology," founding upon these, said that it would seem that the transmission of fluids is almost entirely from the mother to the fœtus. The experiments of W. S. Savory were upon dogs and cats. The animals, of course, were pregnant, and under chloroform. The operation of Cæsarean section was performed, but the fœtuses, although removed from the uterus, and the

amnion punctured, were allowed to remain in connection with the mother through the umbilical cord. An injection was then made of a solution of strychnia into the thorax or abdomen of the fœtuses. Strychnia was selected because of its capability of ready absorption, and its obvious and unmistakable physiological action. In some cases the fœtuses were returned to the abdomen of the mother, and the abdominal wound closed with sutures. In other cases they were not returned to the abdomen, and the only maternal connection was through the umbilical cord. In these last cases there was not even contact with maternal tissues other than through the cord. In every case symptoms of strychnia poisoning developed in the mother. In these fœtuses which were not returned to the abdomen it was seen that the tetanic spasms appeared first, and in about fifteen minutes later tetanic spasms appeared in the mother.

These experiments of Savory, show undoubtedly that there is a return flow of material between fœtus and mother, and that through the umbilical cord and placenta. We do not, however, know its extent. Savory's experiments only indicate the limits of our knowledge at present. As regards other poisons, the probability is that their effect upon the mother through the fœtus would depend upon their solubility in blood serum. It cannot therefore be assumed, that because strychnia can pass in this way that syphilis can also pass. As far as our knowledge of syphilis extends at present, it certainly is not looked upon as a soluble poison. These experiments of Savory's, therefore, do not invalidate the position taken up by Taylor, of New York, when he says, that the embryo is not supplied with cells of any kind, but simply with serum; but Taylor, again, probably goes too far in making such a statement.

Darwin believes that the influence we are dealing with, acts directly upon the female genital organs. In favor of this view, we have the fact that among the *orchidaceæ*, the formation of the female cell is the result of pollination. Supposing, therefore, that all the other cases could be accounted for in this way, the analogy from syphilis would fail. Because in that case, we would expect that syphilis would, instead of inoculating the ovum with syphilis by fertilization and thence the mother, act directly upon the maternal genital organs. But this is a mode of transmission which is denied by every

modern authority on syphilis. Fournier says, that experiment has recently and clinical observation long established, that the serum of a syphilitic subject is not capable of transmitting contagion.

On the other hand, accepting Dr. Harvey's view that the influence acts in every case through the embryo, the analogy is complete; in plants acting upon the embryo and extending from thence to the seed coats and the ovarium; and in higher life, extending perhaps to the whole maternal organism, on account of the permanent ovarium and the lengthened connection between fœtus and mother (here comparable to a case of graft-hybridism), transmitting both physiological and pathological qualities.

That the male element has an influence upon the female, over and above its fertilizing influence upon the ovum must be conceded. The limits of that influence are at present unknown. The wide range suggested by Dr. Harvey is by no means proven, but is quite probable; the evidence does not entitle us to go beyond this.

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[1] Read before the Glasgow Southern Medical Society, March 8th, 1888.

THE INTERNAL AND EXTERNAL

Temperature of the Human Body

AS

MODIFIED BY MUSCLE-KNEADING:

WITH

SPHYGMOGRAPHIC AND SPHYGMOMANOMETRIC RECORDS.

BY

A. SYMONS ECCLES, M.B.

THE INTERNAL AND EXTERNAL

TEMPERATURE OF THE HUMAN BODY

AS MODIFIED BY MUSCLE-KNEADING.[1]

The observations on the internal and external temperature of the human body which I have ventured to offer for the consideration of this section are based upon a series of experiments extending over a period of nearly eighteen months, but the examples selected for their illustration are derived for the most part from the records obtained during the past five months, before and after subjecting healthy individuals to the process of kneading the muscles of the trunk and limbs on the one hand and the abdomen with its contents on the other. The results afforded by these examples are identical with those which were noted in the earlier experiments, differing from them only in their elaboration by the addition of sphygmographic and sphygmomanometric readings taken under the same circumstances as the thermometric records.

In order to avoid as far as possible any sources of error in the investigations referred to, the individuals dealt with were carefully examined as to the state of their organs, secretions, habits, and mode of life; and any conditions which might tend to modify the uniformity of the circumstances under which the observations were made have been noted. Briefly, the subjects were all healthy persons who had not taken food for four hours prior to the hour appointed for experiments, which were carried out in a room whose temperature, as registered by an ordinary thermometer placed at the head of the couch, was maintained at 65° F. The subjects were divested of their

clothing and placed in the recumbent position on a couch or bench, and covered with a Turkey towel sheet and a warm rug. The thermometers were then applied in the situations indicated—an ordinary magnified index clinical thermometer for the axilla, three Immisch's for the surface, and a strong clinical thermometer of the ordinary pattern for the rectum (this last being encased in metal to avoid any untoward accident). As soon as the thermometers had been adjusted, sphygmographic tracings and sphygmomanometric readings were taken of the radial artery on the right side, the pulse being also taken by the finger. In every case Richardson's modification of Dudgeon's pocket syphygmograph was employed, the clockwork being wound up before each application, and the length of the band necessary to inclose the wrist and retain the instrument firmly in position having been ascertained, a distinguishing mark was made on the ends of the band exactly where the clamp was first secured, so that it might be adjusted accurately in the same position on each subsequent occasion of its use for the same individual. The same pressure was always used for all the tracings taken from the artery of a given individual throughout the experiments to which he was subjected, but varying pressures were employed in different individuals. In regard to the manometric records, they were taken with von Basch's pocket sphygmomanometer, care being taken to avoid any error through slow leakage by refilling the tube whenever the drum (or "pelotte") appeared to contain any air; and in each case the compression of the artery was repeated, the reading recorded by the pointer being taken at the moment of perceptible disappearance and again of first perceptible reappearance of pulsation.

The conditions of temperature and circulation having been thus noted, kneading of the lower extremities, trunk (excluding the abdomen), and upper extremities, in the order here set down, was employed for a period varying from half to three-quarters of an hour, according to the time required in order to thoroughly carry out the manipulations, necessarily varying with the muscular development of the individual; but in each case the character and extent of the kneading were rendered as uniform as possible.

At the conclusion of the muscle-kneading the instruments

were reapplied, and, the readings having been taken, abdominal massage was then employed, the stomach and liver being first dealt with, then the small intestines, and finally the colon and sigmoid flexure, the course of the large intestine being carefully followed, its gaseous or solid contents being propelled as far as possible toward the commencement of the sigmoid flexure. Abdominal kneading, as a rule, occupied from fifteen to twenty minutes, but occasionally, as in the case of Example H, the process was prolonged.

The records were again taken, and the experiment thus concluded, save in the cases of certain individuals who submitted themselves to further thermometric investigation with a view to show the length of time during which the effect of the manipulations appeared to be maintained.

The first example to which I desire to draw your attention may be taken as typical of a series in which the effects on the circulation described by me in a paper on the physiological effects of massage, read before the Royal Medical and Chirurgical Society of London in January, 1887, are produced, and further investigated and confirmed by the sphygmographic and sphygmomanometric records. So, also, with the thermometer, previous observations have received confirmation, but an additional inquiry into the internal temperature as indicated by rectal thermometry has been included in the experiments made, with the unvarying result shown in the tables of temperature that as the axillary and surface temperatures rise under the influence of muscle-kneading the rectal temperature falls, while exactly the opposite effect is produced by kneading the abdomen. The subject of this experiment was a healthy male, aged 25, whose height was 5 feet 8 inches and weight 10 stone 12 pounds, with good muscular development, free from organic disease of any kind, and leading an active life.

Table of External and Internal Temperatures in Example H.

Before Muscle-Kneading.	After Muscle-Kneading.	After Abdominal Kneading for 15 mins.	20 mins.	30 mins.	Situation of Thermometer.
98.0° F.	99.4°	98.8°	98.0°	97.4°	Axilla.
90.0	97.0	93.0	89.0	84.0	Palm.
91.0	95.0	93.0	90.0	88.0	Calf
87.0	90.0	87.0	84.0	81.0	Sole.
100.4	99.6	99.8	100.6	101.8	Rectum

It will be noticed in this example that the initial axillary temperature is only 98° F., somewhat lower than that which is indicated on the scale of clinical thermometers as representing the average normal; but I attribute this to the unclothing of the patient, rather than to any inaccuracy in the record, as the thermometers for each reading were kept *in situ* for ten minutes, so as to avoid any error arising out of hurry in taking the note. The surface temperatures having in each case been taken by means of an Immisch thermometer, fractions of a degree are not noted. The effects of muscle-kneading are well seen in this example in regard to the internal and external temperatures; for whereas there is a difference of 2.4° F. between the axillary and rectal temperature, as much as 13.4° F. between the temperature of the foot-sole and the rectum, 9° and 10° respectively between the calf and palmar temperature and that of the rectum, and a corresponding difference between the axillary and surface temperature, it is found, on reference to the next column, that the axillary temperature has been raised 1.4° F., the surface records more nearly approach the axillary degree, while the rectal temperature shows a declination of 0.8° or $\frac{4}{5}$°.

After abdominal kneading only, practised on the same occasion as soon as the temperature and pulse records had been made after muscle-kneading, one finds a gradual decrease in the axillary and superficial temperature, with a steady rise of rectal temperature, until at the close of half an hour's abdominal manipulation (excluding the necessary intervals for the observations recorded at the close of fifteen and twenty minutes), the axillary temperature stands at 97.4° F., a decrease of 2° F. below the post muscle-kneading record, with a much more marked reduction of surface temperature, and a gain in the rectum of 2.2° F. above the degree noted before abdominal kneading, and of 1.2° F. above that which was registered by the rectal thermometer before the muscle-kneading had been carried out. It will, I think, be interesting to compare with these alternations of temperature the condition of the circulation so far as observations on the radial pulse will allow.

First, in regard to the pulse rate, it was found to vary as follows:

Before Muscle-Kneading, ... 78

After Muscle-Kneading, ...	70
After Abdominal Kneading for 15 mins.,	72
" " " " 20 "	66
" " " " 30 "	64

The sphygmomanometric readings were:

Before Muscle-Kneading, ...	130 mm. Hg.
After " " . . .	170 "
After Abdominal Kneading for 15 mins.,	140 "
" " " " 20 "	120 "
" " " " 30 "	120 "

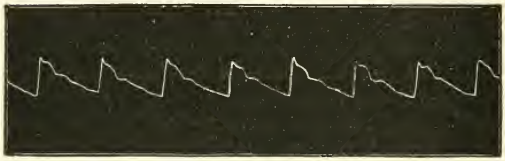
The sphygmographic tracings were taken under a pressure of three ounces, the precautions previously referred to having been taken to insure accuracy.

I will not here attempt to analyze the characters of these readings, except in reference to those which appear to be common to all the experiments, for it will be found that, although one sometimes notes a diminution in the pulse rate after general kneading, excluding the abdomen, occasionally, especially if the kneading is not prolonged, the pulse rate is rather accelerated than diminished, and this (which has occurred more frequently in my practice since the conclusion of the experiments, of which my previous paper on the physiological effects of massage was the record, than before) I attribute to a modification of the reflex action following stimulation of the cutaneous and muscle sensory nerves, which I believe depends not only on the vigor or intensity of the stimulus applied, but also in a great measure on the varying irritability of the general nervous system to which the irritability of the cutaneous sensory nerves is a valuable index. But in regard to the modifying influence of abdominal kneading on the pulse rate it will always be found, so far as my experience hitherto goes to show, that this is in the direction of retardation, even in cases of what, for want of a more clearly recognized condition, are termed abdominal neuroses, in which the pulse rate is already diminished.

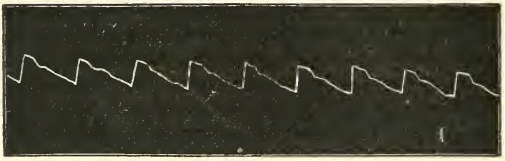
It will be seen on reference to the temperature records, tracings, and manometric readings, which I have brought with me to-day for your inspection, in addition to the examples quoted in this paper, that the records just referred to are by no means the most remarkable, as some of the others afford

SPHYGMOGRAPHIC TRACINGS IN EXAMPLE H. PRESSURE 3 OUNCES.

Before.

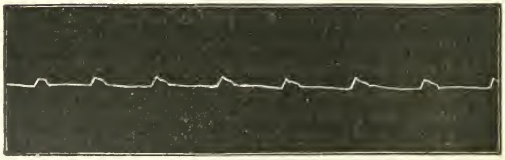


After.

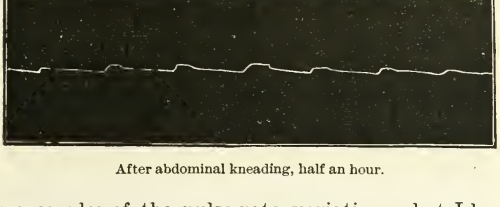


After temperature records before abdominal kneading.

After abdominal kneading, fifteen minutes.



After abdominal kneading, twenty minutes.



After abdominal kneading, half an hour.

better examples of the pulse-rate variations; but I have selected this experiment rather with a view to demonstrate the effect of abdominal kneading as compared with muscle-kneading on the temperature topography than on the pulse.

Now allow me to refer to an example in which, while the majority of effects produced by the different manipulations are similar to those occurring in Example H, it will be seen that here muscle-kneading was followed by acceleration of the pulse rate, other effects undergoing no apparent variation from those noted with a diminished pulse rate.

TABLE OF EXTERNAL AND INTERNAL TEMPERATURES IN EXAMPLE B.

Before Muscle-Kneading.	After Muscle-Kneading.	After Abdominal Kneading,	Situation of Thermometer.
98.4° F.	99.8°	98.6°	Axilla.
94.0	97.0	96.0	Palm.
95.0	97.0	94.0	Calf.
93.0	95.0	92.0	Sole.
99.0	99.0	100.4	Rectum.

The maintenance of the rectal temperature after muscle-kneading alone constitutes the only deviation from the usual condition, and does not occur in the other cases wherein the effects have been noted in dealing with healthy persons under ordinary conditions of activity; but it is not so infrequent in cases of persons whose surface temperature appears to be improved by a course of massage pursued during a period in which the patient is kept at rest in bed.

In this case the pulse rate varied as follows:

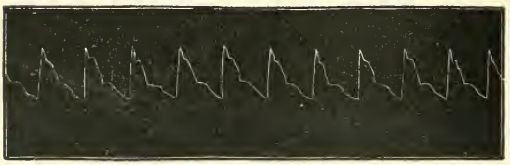
Before Muscle-Kneading, ... 84
After " " 102
After Abdominal-Kneading, ... 60

The sphygmomanometric readings were:

Before Muscle-Kneading,	. .	140 mm. Hg.
After " "	. . .	160 "
After Abdominal Kneading,	. .	140 "

SPHYGMOGRAPHIC TRACINGS IN EXAMPLE B. PRESSURE 2½ OUNCES.

Before.



After.

After abdominal kneading.

Under a pressure of two ounces and a half the sphygmographic tracings show an increase of amplitude of the ascending limb with a more rapid fall after muscle-kneading, the amplitude of the trace, even after abdominal kneading, being in excess of the first tracing taken before any manipulations had been practised, while the retardation of the pulse after the abdominal kneading amounts to 42 beats per minute. The subject was a man, aged 40, of somewhat spare habit of body, who appeared to be free from disease; but he was a little inclined to be afraid of the instruments on this occasion, the

first of several experiments to which he subsequently submitted without alarm.

It appears, therefore, that the effect produced on the rate of the circulation by muscle-kneading varies from not a very marked reduction of rapidity in the majority of cases to an increase in celerity sometimes amounting to twenty beats or more in a comparatively few cases; but clinical experience teaches that the effect on rate alone is not a reliable guide as to whether or not treatment by mechano-therapy is likely to prove valuable; the effects on temperature, however, are very significant, and have been found useful by me in helping to decide as to what dosage of the various manipulations should be employed in different cases. Moreover, it is found that under a course of muscle-kneading extending from three weeks to two months, the temperature topography, which in feeble persons, and notably in dyspeptics and persons suffering from malassimilation, assumes much greater disproportions as between axillary, surface, and rectal temperatures than in health, will be modified very considerably, internal and external temperatures being more nearly approximated and less easily influenced than before the treatment, which of course consists also in careful dieting and rest.

If I have transgressed in referring to these clinical matters before this Section, I have done so because the question may arise in regard to these observations, *Cui bono?* To those who do not regard this method of treating disease by mechanical rather than pharmaceutical means as a fad unworthy of serious investigation, it may possibly impart an interest to these observations on healthy persons undertaken in order to test certain phenomena previously noticed at the bedside, and I would venture to hope that these records, imperfect though they be, may induce some who are inclined to deny the efficacy of mechano-therapy to see whether the failures they have met with are not rather due to its unskilful application by persons who, if they knew how to perform the ordinary manipulations, are not to be intrusted with the administration of the remedy save under the most rigid supervision of one who is conversant with the subject.

It will be seen from the temperature records before you that the immediate effects of muscle-kneading are to raise the external temperature, and at the same time to approximate

the external and internal temperatures, the rectum apparently losing heat while the surface of the body gains it, and in some instances the axillary temperature has been found to be higher by a fraction of a degree after muscle-kneading than the rectal temperature; this may be an error in the thermometry, but as it has occurred with different thermometers and on various occasions, I have thought that possibly it may be accounted for by an actual loss of heat in the abdominal organs owing to the abstraction of blood from them toward the periphery, where not only are the vessels dilated and the blood current increased in volume, but, as I think we may infer, greater activity of interchange between the blood and the tissues has been brought about by the mechanical stimulation of the local nerves. The increased blood-pressure following muscle-kneading is followed by a marked fall on the substitution of abdominal kneading; it would therefore appear that, as abdominal kneading causes a diminution in the volume of the radial pulse, previously enhanced by muscle-kneading, we should not be guilty of unfair theorizing if we believe that the loss of rectal heat is due to a diminution in the calibre and contents of the abdominal vessels with a synchronous cooling of the internal temperature, and this is the obvious conclusion to be arrived at if, on the other hand, the rise in rectal temperature is to be attributed to the altered conditions of abdominal circulation, which it is probable exist in a modified degree, as Goltz proved them to occur in his tapping experiment on the frog. Certainly the characters of the peripheral circulation, as shown by the sphygmomanometer and the sphygmograph, are somewhat akin to those which have been noted when, as it is said, "the animal was as it were bled into its own belly."

The gain in surface-temperature following the muscle-kneading will be lost by radiation if the subject is not kept well covered both during and after manipulation; and it may not be uninteresting to note here that where these precautions are omitted the whole body temperature will be reduced if the surface, with its greatly-dilated vessels, is not protected from the effects of exposure. I have known the axillary temperature, after having been raised to 99.8° F., fall to barely 97° F., and the rectal temperature to below 98° F., the thermometers having both been shaken down to 95° F. before being placed

in position. Now this loss of heat does not follow either the one form of kneading or the other if the surface of the body is kept covered. The immediate effects of the process do not maintain their intensity for a longer period than an hour, so far as my observations serve; but for three hours after a noticeable effect exists, in that the temperature will remain more nearly equalized, and the amplitude of the pulse-tracing remains increased above the record taken prior to the muscle-kneading for over two hours after the conclusion of the experiment.

The effect of manipulating the muscles on the circulation, as shown by the sphygmograph, is invariably that the amplitude of the ascending portion of the trace is increased, and with this it is also rendered more vertical; dicrotism as a rule appears to be less marked, and sometimes a systolic plateau is developed to a greater extent than it was prior to the kneading; but with the exception of the increase in amplitude and verticality, there is no constant feature common to all the tracings taken. This greater amplitude and verticality of the systolic wave must, I suppose, denote a more sudden and forcible contraction of the ventricle, though, as some of the traces show, this does not always imply a short, sharp systole, for in certain of the subjects the contraction appeared to be prolonged, a long vertical upstroke being followed by an almost horizontal short line terminating in a more or less well-defined notch.

Burdon Sanderson has attributed the sharp expansion of the artery to reflex influences on the heart, and has described what he calls "the shock sound" heard at the impulse preceding or inaugurating the first sound of the heart; this sharp sound I have only been able to recognize in the cases where the pulse rate was reduced after muscle-kneading in patients suffering from chronic Bright's disease or gouty symptoms with arcus senilis and other signs of arterial degeneration, and in one case after a month's kneading the sound appeared to be less easily distinguishable. The greater verticality and amplitude of the wave in the tracings appears to be associated with an increased quantity of blood sent through the vessel, which is obviously dilated; it may be that on the conclusion of the kneading the vessels of the limbs are almost over full, and thus give rise to the sudden and more forcible contraction

of the heart, in order to send the blood through the distended vessels; the manometric records point to a greater fulness of the vessel, and this also is usually apparent to the finger. The conclusions I have ventured to arrive at from the results obtained by these experiments and clinical observations are that after general kneading, excluding the abdomen, the amount of blood sent out by each systole is increased, the quantity of blood sent to the right side of the heart being increased by the centripetal squeezing of the veins, the circulation through these vessels being by this process aided and accelerated, thus providing a greater volume of blood for distribution by the pulmonary system, and so supplying a larger quantity of blood to the left side of the heart, the increased pressure so produced within the ventricle stimulating it to more forcible contractions. The force of the cardiac systole, I believe, is increased, whether the pulse rate is accelerated or retarded by muscle-kneading, the influence on rhythm being of a reflex character, depending on the degree of stimulation of the sensory nerves, the slighter stimuli afforded by moderate kneading[2] affecting the accelerator centre, which we are told that "it is more than probable exists in the medulla oblongata,"[3] while the stronger stimulation of vigorous kneading affects the vagus centre.

My reasons for believing that the increase in pressure recorded by the manometer after muscle-kneading depends on the action of the heart equally in the cases of accelerated and retarded pulse rate, rather than on the condition of the peripheral vessels, are based on the fact that the manometric pressure was estimated at the moment when the pulse ceased to be felt by the testing finger on the distal side of the drum or "pelotte." I am aware that, unless the greatest care is taken to avoid too long compression of the vessel, an erroneous reading will result, as one will obtain a record of the centripetal *plus* the centrifugal wave, if practice has not rendered the tactile sense more keen than it is at first when commencing to employ von Basch's little instrument; and, unless I had been warned against this source of error, and had been careful to obviate mistakes arising out of it, I should not have ventured to draw your attention to this phenomenon of apparent independence between pulse rate and pressure, or rather, as I would prefer to state it, with great diffidence, as the result of

these observations, the apparent independence of the force of the ventricular contractions on their number.

Marey has shown that the effect of muscular action, as tested by his experiment on the horse, in which he applied his compensating manometer to the carotid before and after making the animal canter for ten minutes, is to increase the frequency of the pulse and to decrease arterial tension, exactly opposite conditions arising after the animal had been allowed to rest; from which he argues that the first effect of muscular exercise is to accelerate the course of the blood in the vessels of the limbs, the acceleration of the heart's rhythm being a secondary effect, and depending on the decrease of arterial tension which follows on the dilatation of the peripheral vessels. Within the limits of this paper it is not possible to detail further the deductions drawn by so great an authority on this subject, but he sums up his views thus:

"So, then, one of two conditions exists; either the force of the heart is first increased, and under some exciting influence the beats of the heart are accelerated; or the first effect is a more easy flow of blood through the small vessels, from which arises lowering of arterial tension and secondary acceleration of the heart. One way of settling the question is to gauge the arterial tension by means of a manometer. In fact, in the first case, if it is an excess of impulsion which constitutes the initial phenomenon, there ought to follow an elevation of arterial tension. In the second case, the tension will be diminished. The enormous increase of energy in the heart's beat under these circumstances would tend to make us believe that the heart really expended greater force after violent muscular exercise. It is not so. The fall of arterial tension increases the force of the pulsations of the heart and arteries."[4]

It was a source of great perplexity to me when I found, both under the circumstances of increased and decreased rapidity of pulse after muscular kneading, that, with what one believes to be a condition of dilated vessels as shown by the greater warmth and redness of the surface, and the visibly greater fulness of superficial vessels, one also obtained from von Basch's sphygmomanometer a rise of pressure; and if careful search for a source of error and constant repetition had not confirmed the result of the earlier experiments, I should have felt still greater hesitation than that which I feel

to-day in drawing your attention to this unexpected and unlooked for condition, which is apparently the result of kneading the muscles of the limbs and trunk.

I much regret that I have not been able to institute control experiments with a schema which doubtless would have helped to clear up this difficulty; but, failing this, the fact remains that unless some fatal inaccuracy has crept into the observations made, the sphygomomanometric pressure is increased independently of the increase or decrease in the number of the heart's beats, and in spite of the dilatation of the vessels; so that, in default of a better explanation of this phenomenon, one ventures to suggest that the effects of muscle-kneading, as shown by thermometric, sphygmographic, and manometric readings, is to increase the force of the heart's action, the quantity of blood passing through the external organs (muscles and skin), and the interchange between these tissues and the nutritive fluids, whose passage through them is thus facilitated.

On the other hand, judging from the results obtained by similar tests in their application to the effects produced by abdominal kneading, one believes that by this process the rhythm of the heart is influenced uniformly in the direction of retardation, the vessels of the external tissues, probably also of the brain,[5] are contracted and unloaded, the circulation through these parts, as also their warmth, being diminished; while, judging from the increase of rectal temperature arising during and after the process, it is probable that the abdominal organs undergo a modification of their circulatory conditions similar to that shown to exist in the skeletal tissues after muscle-kneading.

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THE

DISEASES OF THE BREAST.

BY

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With 13 Engravings and 4 Chromo-Lithographs.

DISEASES OF THE BREAST.

CHAPTER I.

The object of this work is to place before the student and practitioner a clinical exposition of the abnormalities and diseases of the breast, more particularly with reference to their diagnosis and treatment. With this view the descriptions of pathological processes have not been placed in the foremost position, and it has been assumed that readers of this volume are familiar with the leading *macro*scopical as well as *micro*scopical features of the different varieties of tumors, such as are to be found described in the many excellent works on pathological anatomy.

The pathological aspects of disease have, however, been referred to, to elucidate its clinical phases, and more particularly to show how the signs and symptoms of local disease are to be explained by progressive pathological processes.

To render the clinical aspects of disease clear, brief notes of cases have been quoted, to illustrate either a subject or a symptom; and with a like object colored plates have been freely introduced, many of which have been copied from the originals in Guy's Hospital Museum.

In preparing this work I have to thank Dr. J. Goodhart for his kind aid in revising the pathological portion, and Mr. C. Symonds for some valued microscopical investigations.

ANATOMY OF THE BREAST.

It is essential that the practitioner when examining a diseased breast should always have in his mind's eye the anatomy of the healthy organ. He should remember that the

breast is a skin gland situated in the connective tissue between the layers of the superficial fascia; that the gland itself is encapsuled, with its posterior wall slightly concave, resting and moving upon the pectoral muscle, and the anterior wall convex, separated from the skin by more or less lobulated fat, and at the same time connected with it, in suspended form, by fibrous bands, which are known as the suspensory ligaments of the breast (Plate I., Fig. 1).

The boundaries of the gland are not, however, always very exact, and it is not uncommon, as demonstrated by disease, to find processes, or rather lobes, of the gland projecting into parts which seem to be outside the radius of the normal gland. The frequency of this extension from its axillary border is so great, that it may be open to a question whether it may not be regarded as a normal condition. In operations upon the breast this anatomical condition is worthy of remembrance.

In thin people there is but little fat between the gland and the skin covering it, and under such circumstances there is an absence of that roundness and plumpness which so characterizes the breast of a healthy and well-made woman.

On the other hand, in fat women, even when the gland itself from senile atrophic changes has shrunk to very small dimensions, the deposit of fat around the gland being large, maintains the shape and size of the breast.

The presence or absence of fat about the gland has consequently an important bearing in modifying the manipular indications of a healthy as well as of a diseased breast. A small tumor in a thin breast is readily recognized, whereas in a fat one it might be overlooked; and a scirrhous infiltration of an atrophic breast of a fat woman might suggest the presence of a large tumor, when in reality the bulk of the growth is fatty tissue.

The practical bearing of the existence of the suspensory ligaments of the breast is very great, since it is by the shortening of these ligaments that the characteristic "dimpling" and "puckering" of the skin, so frequently seen in the infiltrating form of cancer of the breast, is brought about.

The gland itself is a conglomerate, racemose, or compound organ, made up of from fifteen to twenty distinct lobes, subdivided into lobules; the lobules on section presenting a pale pinkish cream-colored appearance. Each lobe is held together

by firm fibrous tissue, and yet at times is separated by fat; each lobule is surrounded by connective tissue for a support, as are likewise the smaller lobules and secreting acini of the gland.

This connective tissue may become the seat of connective-tissue neoplasms (sarcomata); the acini and ducts the seat of adenomata and epithelial (cancerous) neoplasms.

Connected with each lobe there is an excretory galactophorous or lactiferous duct, which terminates in the nipple, and during lactation this tube as it approaches the nipple becomes dilated into a sinus or ampulla, one-quarter or one-sixth of an inch wide, and these ampullæ act as reservoirs for the milk when secreted. Each terminal tube opens in the nipple by a separate orifice, which is smaller than the tube, while the small initial tubes or ducts of the acini and lobules unite together, and so help to form the larger tubes as they converge toward the nipple.

The lobes, lobules, and acini of the gland are lined by an almost structureless basement membrane covered with epithelium, and this epithelium varies in character according to its position and to the condition of activity of the glands. In the lactiferous ducts, from the reservoirs to their terminations, the epithelium appears as small oval corpuscles with a central nucleus to each; toward the orifices of the ducts the epithelium tends toward a squamous appearance. In the reservoirs the epithelium is of the tesselated form; columnar cells are said also to be present by Kölliker and Birkett. When the breast is in an inactive condition the epithelial cells are small and granular, but when physiological activity begins, the alevoli enlarge, and become filled with a clear secretion. The cells appear flattened out against the membrana propria, or basement membrane, and contain fat globules of varying sizes. When the gland is in full activity the epithelial cells become cubical, or even columnar, but are irregular in size, and exhibit indications of segmentation, and discharge into the cavity of the alveoli.

"The secretion of the breasts is formed by the bursting of these cells, and the discharge of their contents into the alveolus, the fat globules which were present within the cells becoming suspended in the fluids of the alveoli as milk globules, and the albuminous constituents of the cells becoming dis-

solved and forming the casein and other proteid substances of the milk."[1]

"The mature functions of the breast," writes Creighton, "are in effect a sustained repetition of those cellular changes which the embryonic cells went through in order to become the breast," and no doubt the spurious or morbid pathological evolution and involution of the gland is marked by changes in its epithelial or secreting structure, which in a measure or to a degree simulates these changes.

In intermediate stages between these two extreme physiological conditions, as well as when the gland is in a morbidly active state, changes in the epithelial lining of the acini will be visible, analogous to those which take place in the gland in its physiological evolution and involution.

The blood-vessels of the gland, which are numerous, invest the alveoli, but do not come into direct contact with the secreting cells themselves. In the breast, as in other secreting glands, the vessels lie outside the basement membrane upon which the epithelium is placed, and according to Schäfer are separated from the secreting cells by the lymphatics. Hence, the material for the nutrition of the cells is not drawn from the blood direct, but from the lymph of the breast gland.

The arteries of the breast are thoracic branches of the axillary, branches from the aortic intercostals, and the intercostal branches of the internal mammary. There is a markedly free anastomosis of veins, more particularly around the areola.[2]

The lymphatics from the breast are also numerous; they are superficial and deep, and pass in two main lines. Those from the axillary and lower half of the gland run to the axilla; whilst from the sternal half they pass to the glands situated along the course of the internal mammary arteries beneath the sternum. Lymphatics from the upper part of the gland pass into the cervical region, and not necessarily through the axilla.

The nipple (mammilla) occupies a position slightly below the centre of the gland, on a level with the lower border of the fourth rib; its projects in the virgin state forward, outward, and slightly upward; during the progress of a pregnancy it turns downward. The surface of the nipple is dark, and around it is an areola, which in the virgin is of a light

rosy pink color, and in the prolific matron becomes dark; the darkness of the areola commencing at the second month and increasing with every month of pregnancy. As the gland returns after lactation to its quiescent condition the darkness of the areola may diminish, but does not disappear.

The skin of the areola is wrinkled and covered with roundish elevations, which are sebaceous follicles known as large and small areola glands; every gland opens by four or five ducts on each papilla. When the ducts are obstructed a sebaceous tumor may form. The nipple contains some muscular tissue, and the terminations of the fifteen or twenty excretory gland ducts. The central ducts are the larger; and outside the ducts, in the areolar tissue which surrounds them, the blood-vessels ramify. The ducts become narrow at their orifices, and open in the little depressions seen in the apex of the nipple.

The skin covering the mammary glands receives its sensibility from the anterior and middle branches of the second, third, fourth, and fifth intercostal nerves, whilst the skin over the upper border of the gland is supplied by the supraclavicular branches of the cervical plexus. These points should ever be remembered, for pain may follow the course of these nerves and be experienced over the region of the breast which they supply, without the existence of any breast disease.

The mammary glands are the same at birth in both sexes. The development of the gland takes place in the female at puberty, at or before the first catamenial period. From puberty to the cessation of the catamenia the glands are in the condition of dormant developmental perfection, but this stage itself is reached only when from pregnancy the full physiological functions of the glands are called into activity.

After the cessation of the catamenia, when the functional activity of the glands can no longer be called into requisition, a period of functional decline commences, which in the healthy subject ends in a simple atrophy of the secreting acini of the glands.

At each of these periods certain troubles are prone to appear, to which attention will be drawn in the following chapters.

CHAPTER II.

ABNORMAL CONDITIONS OF THE BREAST AND NIPPLES.

The abnormalities of the breast and nipple show themselves either in the way of excess or of deficiency. Those of excess are the more common, and strange as it may seem, they are more frequent in the male than in the female sex. Dr. Mitchell Bruce, to whom we are indebted for an able paper on this subject,[3] tells us that out of nearly four thousand men and women examined consecutively, sixty-one had supernumerary nipples, forty-seven were males and fourteen females. In a second series of cases, examined exclusively for the purpose, about seven out of every hundred consecutive individuals had the deformity, and it was found nearly twice as often in men as in women. Five out of six of Bruce's cases had but one supernumerary breast or nipple, whilst the sixth had more than one. Most of the instances observed have been situated on the front of the trunk, below the level of the ordinary mamma, and somewhat nearer the median line of the body than the normal gland. These supernumerary parts were distributed, as ingeniously pointed out by Bland Sutton, in the course of the internal mammary and deep epigastric vessels. In exceptional instances these excesses have been found in extraordinary positions. Again, these supernumerary parts are more frequently found on the left than the right side of the body, in the proportion of sixty to forty per cent. The figures of Bruce, Leichtenstern, and others, clearly indicate this fact.

Leichtenstern, in discussing the cause of this curious disproportion, maintains that the left mamma is on an average more developed than the right, and mentions Hyrtl's explanation of this inequality, that it is so because mothers use the left gland more in suckling. He, however, himself maintains that the same condition holds good in the child and virgin,

which, if a fact, adds Bruce, is probably an instance of variety "as the inherited effect of use,"[1] and a point of extreme importance in the question of the significance or origin of supernumerary mammæ. "We may doubt also," wrote Darwin, "if additional mammæ would ever have been developed in both sexes of mankind, had not his early progenitors been provided with more than a single pair."

The supernumerary nipple is commonly placed about three inches from the normal nipple. In exceptional cases it may be only about one inch distant, while in others it may vary from three to six inches. But whatever may be the distances in childhood, Bruce has satisfied himself that the distance may increase considerably with age.

The characters of the supernumerary gland or nipple vary exceedingly. "Some examples," writes Bruce, "might be chosen for description, which in every particular, except size, resemble an ordinary male mammilla, while others require considerable experience for their discovery and identification. The best-marked cases present the central papilla or nipple proper, a pigmented areola, follicles, hair, and a distinct depression on the apex of the papilla. Examples such as these are, however, very rare. The more usual condition is the presence of a small papilla, or elevation more or less like the ordinary male mammilla, "or a low ovoidal prominence, with its long diameter in the transverse direction, slightly inclined downward and outward, and having its summit usually distinctly cleft into two lobes by an opening or deep groove parallel with the diameter, this variety somewhat resembling the retracted nipple of some female breasts."

The papilla of the supernumerary mammilla may frequently be found erectile.

The areola of a supernumerary nipple may be entirely absent, or it may be represented by the smallest line of pigmentation around the base of the papilla. In some cases it exists as an areola of natural dimensions and appearances; in others it is pigmented in variable degrees, whilst in some examples all pigment is absent.

Follicles and hairs are not commonly present in the supernumerary nipples. In exceptional examples, however, some strong pale or black hairs are met with.

Supernumerary nipples found above the normal mammilla

are very rare. Bruce says only four cases of the abnormality are on record, and in all of these four the supernumerary was placed outward as well as upward from the normal organ. Dr. Fitzgibbon has recorded an example of this kind, in a soldier, aged twenty-four, a native of Jamaica, who not only had two supplementary nipples, one on each breast about one inch below the normal nipple, but two pigmentary deposits, one on either breast higher up above the ordinary mammillæ, which were clearly supernumerary nipples. When the man was young the lower supplementary were larger than the natural nipples. When seen by Dr. Fitzgibbon they were smaller. Among the cases of supernumerary breast which have been recorded, three are four or five in which five mammary glands existed; one of these has been minutely described by M. Gorré, as reported by Percy. Four of the glands in M. Gorré's case were very projecting, full of milk, and arranged in two lines; the fifth breast was not larger than the breast of a girl before puberty, and was placed below and in the middle of the body, between the interior pair, and five inches above the umbilicus.

Cases in which four breasts have been seen are recorded by Sir A. Cooper, Dr. Robert Lee, and Dr. Shannon; others in which three breasts existed, by Dreger, Bartolin, G. Hannæus, J. Borel, Robert, and Sneddon. Where these abnormalities exist others are not unfrequently associated with them. Thus, in a girl, aged six, whom I saw in September, 1883, with a supernumerary nipple and areola one inch below the left nipple, there was some malformation of the genital organs; apparently no vagina, and a clitoris as large as a boy's penis, with prepuce and orifice as of a urethra, which passed down the clitoris for half an inch; the urethra was normal.

Percy states that Anne Boleyn, who had six fingers and six toes, had three breasts.

Supernumerary glands are sometimes active; and as a rule it has been from their functional activity during pregnancy or lactation that their presence has been made known. Dr. Bruce had not, however, seen an example of this kind, and in not a single instance would the subject of the abnormality confess to any alteration of the parts in pregnancy or during menstruation.

On April 6th, 1831, Mr. Roberts, an able practitioner, exhibited before a London Society (the Hunterian) the model of a female breast with two nipples. They were a quarter of an inch apart, and the woman was able to suckle by either. It is said, indeed, that in most of the examples recorded when the breast is lateral, the supernumerary nipple emitted milk, but when it is median, this is not always the case. In an instance which has passed under my observation, this was not, however, the condition; the case was as follows: Supernumerary nipple and breast. Sarah P., aged forty, the mother of eight children, all of which she had suckled, came under my care on September 25th, 1862, with a supernumerary nipple about two inches below her right breast. The nipple looked quite like the ordinary nipple, but never discharged milk. It did not appear to have any connection with the right breast, but the parts beneath it were full, and this suggested the presence of a supernumerary gland. The fact, however, that during her eight pregnancies no milk was secreted proves the contrary.

This deformity, like others, is at times hereditary, but not being a self-evident one, the fact of its being so is not often to be made out. Both Bruce and Leichtenstern failed to find evidence in any of their cases of heredity, and it is mentioned in only seven out of ninety-two cases recorded before these authors investigated the subject afresh. M. Robert has, however, reported the case of a woman with a supernumerary breast, whose mother had the same anomaly, and Dr. B. Woodman saw a mother and daughter each of whom had three nipples. Dr. Handyside has reported a case where two brothers had four breasts each, the two supernumerary glands being placed below the normal mamma, but nearer the median line of the body.

Supernumerary mammæ are found at times in strange places. Two instances of supernumerary glands have been recorded by Leichtenstern as having existed upon the back. Both have, however, been taken from old works; one from Paulinus, and the second quoted by Helbig. Leichtenstern accepts the cases as true, and upon his authority I name them. Klob has recorded one case in which the mamma was placed over the acromion process of a man, and was the size of a walnut; it had also a good nipple. In M. Robert's case the abnormal gland was placed "on the outer part of the left

thigh, four inches below the great trochanter, and was about the size of a lemon. It was the seat of pain, and of sensations like those of the normal breasts, at the catamenial periods. The possessor of it had suckled several children with the third breast. The mother of the woman, aged fifty, had three breasts, all in the chest." M. Jussieu reports the case of a woman who had a third breast in the groin, with which lactation was performed. "I know of no case in literature," adds Leichenstern, "where accessory breasts or mammæ have been met with below the inferior border of the ribs upon the abdomen." Bruce has, however, recorded in his paper two, if not four cases in which it was clear that the supernumerary nipples had an abdominal position.

The existence of axillary mammæ cannot be doubted. Leichtenstern has recorded five, one of which he saw. It was in the left axilla, and had associated with it a supernumerary nipple below and internal to the normal one of the same side.

A. Förster has recorded a case in which the supernumerary breast was in the axillary region and the seat of carcinoma.

A. H. Cameron recorded[5] a case of a pregnant woman who had an axillary swelling, in which there was a small orifice, but no nipple from which milk could be squeezed. Cohn also, at a meeting of the Berliner Medizinische Gesellschaft in February, 1885, exhibited a patient precisely similar to Cameron's. Cameron, in his paper, suggests that if morphological theories fail to explain the abnormality which he had described, we may accept Laycock's view that the mamma is simply an enlarged and highly developed sebaceous gland, and might make its appearance in any part of the body.

Since the above remarks were written, Dr. Champneys has described, in an able paper on the development of mammary functions of the skin of lying-in women,[6] thirty cases of what he has termed milk-producing tracts of integument, or axillary lumps. These were mostly on the right side when not symmetrical, and were developed generally *pari passu* with the breast.

The secretion from the lumps was of three principal kinds: (*a*) granular débris, like the secretion of sebaceous follicles; (*b*) colostrum; (*c*) milk. It was expressed from the situation of the sebaceous follicles, as marked by the situation of the hairs. The whole surface of the lump produced secretion;

there was no centralization. These axillary lumps seem to prove that in lying-in women the sebaceous follicles of the skin are capable of producing true mammary secretions. They confirm the opinion that the breast is a highly specialized aggregation of highly specialized sebaceous follicles. The least specialized form is that here described, where the skin is merely thickened, and the sebaceous glands produce true mammary secretions. The next form is that where there is an aggregation of the ducts which open by one or more external pores. The highest rudimentary form is where an extra nipple or more is superadded to the last variety. It is also well known that nipples may be developed independently. It is far from improbable, adds Champneys, "that these 'axillary lumps' may share the pathological affections of the breast, and even be the seat of abscess." I would go farther and add neoplasms, for I believe the existence of these lumps may explain the occasional existence of primary sarcomatous or cancerous tumors in the axilla, or beneath its anterior fold, which otherwise are difficult of explanation.

CHAPTER III.

HYPERTROPHY AND ATROPHY OF THE BREAST.

Hypertrophy.—When a breast gland is universally enlarged it is said to be hypertrophied, and the enlargement is supposed to be due to a simple increase in the normal structures of the gland, and not to either an overgrowth of any one of its structures, or to the presence of a neoplasm or new growth.

The hypertrophy in the case of the breast is supposed to be similar in kind to that of other parts, in which from increase of function there is increase of nutrition, and as a result the elements of the structure grow and multiply to enable it to perform increase of work. How far this analogy is correct may be open to a question, since it is quite certain that in some so-called hypertrophied breasts there is little or no breast secretion, even when the non-hypertrophied gland has been brought into full activity by pregnancy; and, further, that a large proportion of examples of this affection is met with in single women, and some examples in male subjects.

A woman, aged 43, came under my care some twenty-five years ago with an enormous right breast, which had been steadily increasing in size for thirteen years; it was when seen at least six times the size of the left gland; it hung down heavily, and caused distress from its mere weight. Its nipple was natural. The woman married, became pregnant, and was confined naturally. She suckled her child comfortably from the left and unenlarged gland; the right so-called hypertrophied gland gave no milk, and although it enlarged somewhat during the first few weeks of lactation, it neither gave rise to trouble nor showed signs of physiological activity.

With these facts before us, the enlargement of the breast can hardly with any correctness be called a hypertrophy, since the gland structure itself gave no evidence even of its normal

development, much less of any increase in its structure; and the functions of the enlarged gland, even when stimulated by a completed pregnancy and lactation, failed to come up to the point of normal secretion.

Many years ago the same point was demonstrated in the case of a young married woman, aged 25, who came to me with an immense right breast of some years' growth, and a complaint that from some mechanical cause her husband could not have complete intercourse with her. On examination I found she had a double vagina and a bifid uterus, and form these facts the sexual difficulty of which she complained was fairly explicable. I told the patient that probably a division of the vaginal septum by means of the galvanic cautery would prove of service, and while she was considering the point, the question of pregnancy arose, as she had missed a period. The surmise of its possibility turned out to be true, and in due time she was delivered of a boy. The enlarged breast, however, never secreted milk, though the small or normal gland gave abundance. All sexual difficulty had vanished. It is interesting to note that in this case of enlarged breast, as well as in one of supernumerary nipples previously recorded, the genital organs were abnormal.

I have before me notes of five other cases of hypertrophy of the breast which occurred in women, and of four in men. Of the five female cases, four were single and one a married woman; the latter was 33 years of age, and the right gland was affected. Of the single women, in three the ages were respectively 19, 21, and 25 years, and the left gland was the one involved; in the fourth case the girl was 17, and both glands were implicated.

One of the single women, aged 21, had a sister under my care for a large adeno-sarcomatous tumor the size of a cocoanut, which I successfully removed. In two of the five cases the catamenia were quite regular, in three this was not the case.

Of the four male subjects, one was a tailor, aged 25, and his left breast was as large as a well-grown woman's; one was a hatter, aged 31, the affection was in his left breast, which was as large as an orange; it had been growing for six years; the third case was a man, aged 20, the right breast had been increasing for three years in a painless way, and was

the size of a fist; the fourth case was a boy, aged 18, and his left breast, which had been growing for two years without pain, was the size of a half a large orange.

It is worthy of note that of the ten cases recorded in which one gland was affected, in six it was the left.

The most striking example of this affection I saw in 1865 with my friend Mr. Shipman, of Grantham. It was in a single woman aged 19, and both breasts were affected. They had been increasing for a year and a half, and were removed, at an interval of three months of one another, by Sir W. Fergusson. One specimen is now at the College of Surgeons (Prep. 4,739). The gland on removal measured one foot in diameter, and weighed thirteen pounds. Except in its increased size and in the corresponding size of the blood-vessels, which (in the preparation) have been injected, there is no apparent change from the normal condition, although on microscopical examination the normal glandular structure was found to be mixed with a great increase of fibrous tissue. The adjoining engraving was taken from this patient.

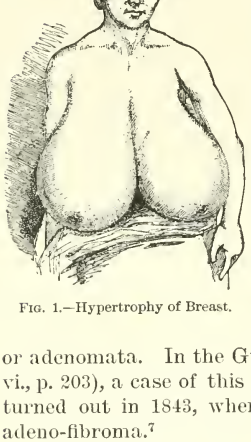


Fig. 1.—Hypertrophy of Breast.

The reader should remember that this affection may be simulated by the presence of new growths, such as lipomata, enchondromata, or adenomata. In the Guy's Hospital Reports for 1841 (vol. vi., p. 203), a case of this supposed trouble is reported, which turned out in 1843, when Mr. Stanley removed it, to be an adeno-fibroma.[7]

No treatment appears to have any effect in these cases except excision, which is to be performed only when the local affection is a source of serious trouble.

There is no evidence to show that this so-called hypertrophy of the breast has any connection with an inflammation. The breast in these cases, in both male and female subjects, may occasionally be more tender than the unenlarged gland, but this symptom is not always present. In the case of in-

flammation of the breast in the male subject recovery generally follows treatment, and I have not seen one instance in which such enlargement became permanent.

Atrophy of the Breast.—By this term is meant the diminution in size due to a wasting of the secreting structure of the breast, the result either of old age, or of some antecedent inflammatory or other change by which the nutrition of the gland has been interfered with.

When it accompanies old age, it is a physiological and consequently a natural process; the breasts with the procreative organs wasting like other glands as soon as they have played their parts in the animal economy, and are no longer wanted for active service. When it occurs during the functional activity of these same organs, the wasting cannot be so explained, and the conclusion has to be drawn that the gland has either not been fairly formed to perform its functions when called upon, or that some pathological change has taken place in it by which its secreting power has been crippled or destroyed. The former explanation is illustrated when a breast which is apparently healthy fails to develop and secrete milk during pregnancy, and the subsequent lactating period (agalactea); and the latter, when a breast which has once performed its functions normally becomes the seat of inflammation, possibly of suppuration, and recovers, and then fails to respond to the physiological demand made upon it by another pregnancy.

In the wasting of old age, there may be no external or visible signs of atrophic changes, the development of fat in and about the gland rendering the actual state of the part obscure; nevertheless, on making a section of such a breast, the anatomist will often find a difficulty in distinguishing the gland, since what remains of it will consist mainly of the nipple and its ducts radiating into the fatty and fibrous tissue with which it is surrounded, the ducts often containing a thick mucus. The surgeon also will frequently be surprised to find, when removing a breast the seat of an infiltrating carcinoma, how limited the disease appears to be, although the mass removed may have appeared large; the infiltrated and contracted mammary gland presenting on section a limited tumor surrounded with fat (Plate 3, Fig. 3).

In the museum of the College of Surgeons there is speci-

men (Prep. 4,819 B) of extreme atrophy of the gland which I removed in 1883 from the person of a lady, aged 65, supposing it to be a carcinoma. It is described in the catalogue as follows: "An extremely atrophied breast, two and a half inches in diameter, of which the nipple is enlarged by a growth of dense fibrous tissue, both within and beneath it, and is pyramidal in shape. The other parts of the gland are of firm fibrous texture, but are less dense than the nipple." With the microscope, only fibrous tissue and a few compressed, atrophied ducts, but no cancerous growth, could be found.

Protracted or frequently repeated lactation is often followed by a rapid diminution in the size of the glands, and in exceptional instances even to their apparent complete loss. In some cases this rapid wasting is real, while in others the breast gland, although apparently gone, rapidly reappears under the stimulus of a pregnancy, and becomes in due time well prepared to discharge fully its natural functions.

Some breasts, likewise, that have been the seat of an inflammation, or of a limited suppuration, are rendered permanently unfit for duty; while, on the other hand, glands that have been scarred all over from abscesses and incisions, and which might be supposed to have been so injured as to have been rendered physiologically useless, reassume, on the recurrence of their natural stimulus (pregnancy), their lactating functions; indeed, such breasts seem to secrete more fully than others that appear larger. The size of a breast, *per se*, is no real indication as to its secreting power, small glands frequently yielding more milk, and more readily, than large ones.

When tumors develop in a breast, its secreting functions may not be much interfered with, for I have known women with adenomata suckle freely, and one with a cancerous breast nurse as well on the affected as on the sound side.

CHAPTER IV.

INFLAMMATION OF THE BREAST.

This affection occurs at all periods of life, and in every condition of the organ; that is, it may be met with even in male or female infants soon after birth; in boys and girls at the age of puberty; in women who are pregnant or lactating; as well as in any subject male or female, who may have been locally injured. Traumatism, under all circumstances, has a powerful influence in exciting the affection, and the more so when the gland is in a condition of functional activity. In exceptional cases the affection may occur in men or women without any assignable cause.

The inflammatory action may be acute or chronic. It may terminate in resolution, or in the formation of an abscess. It may involve either a single lobe of the gland, or the whole organ. At times the inflammation will involve rather the periglandular areolar tissue than the gland tissue itself; on still rarer occasions it will affect the connective tissue behind the gland, and give rise to a retro- or submammary, abscess.

I propose, therefore, to consider this affection under three headings, as it is met with during the period of infancy, at puberty, and during pregnancy and lactation.

Inflammation of the Breast as seen in Infants.—This is by no means an uncommon affection, and although it may occur without any assignable cause, it is, in the majority of cases, due to the rough manipulations of nurses who have not wholly escaped the unenlightened influence of the "Gamp" school, and think it right either to "rub away the milk," or "break the nipple strings" of infants three or four days old, a practice which has only to be alluded to to be condemned. It should be well known that the breasts of infants of both sexes during the first few days of life not infrequently contain a secretion of milk somewhat similar in character to that of the

mother; that is, it is made up of fluid containing colostric bodies and milk globules in different proportions. The breasts under these circumstances become full, and, as a consequence, tender, and at times a milky fluid escapes from the nipple. The glands are fullest from the fourth to the seventh day, and after that, if left alone, they gradually empty. In exceptional cases they may increase in size, inflame, and suppurate; and, should they be roughly manipulated, squeezed, or rubbed, these changes are almost sure to follow. The majority of cases of irritable or inflamed breasts in the infant, if rightly treated by soothing warm sedative applications, such as the subacetate of lead and opium lotion, and protected by cotton wool from external pressure, generally do well. The cases that suppurate come to the surgeon, and in these the breasts have usually been roughly treated. When they suppurate they must be opened, drained, irrigated by some iodine or other antiseptic lotion, and treated as an ordinary abscess.

In 1864 I saw a female infant, aged two weeks, with inflammation of both mammary glands, and the inflammation had clearly followed rough manipulation. The glands were much swollen, and the nipples were quite depressed in the centre of the swellings. One breast (the right) suppurated, the left recovered by resolution. The nipple, however, remained retracted. I give this case as an example of retraction of the nipple from early inflammatory action, believing that such cases may be more common than is usually believed.

An abscess may, however, occur in a child's breast at a later period than a month. I saw one in 1868 in a female, and apparently healthy, child eight months old. The left breast was acutely inflamed and it had become so a week before without any known cause. The gland suppurated, and was opened and treated with a good result.

Inflammation of the Breast as met with at Puberty.—At the age of puberty, even in the male subject, there may be signs of increased activity in the mammary gland, as indicated by greater fulness of the breast, with tenderness; of darkening of the areola and nipple. Occasionally this increased action goes on to inflammation and suppuration.

In the female subject, remarkable structural evolutionary changes take place in association with the growth and development of the ovaries and sexual organs, and under such cir-

cumstances there are frequently present external and visible signs of this activity, which may last either for a brief period, and then disappear never to return, or may reappear with more or less force at every return of the catamenial period. Should anything occur from without, such as injury, or from within the gland during its active growing time of life, to interfere with natural evolutionary changes, inflammation may ensue, and either subside or end in suppuration. It is, however, a rare event for a breast, during the period of its development, to suppurate.

On June 2d, 1862, such a case came under my care in the person of Fanny R., a healthy-looking girl, aged 15, in the form of an acute abscess in the right breast. It had commenced without any known cause two weeks previously, that is, on the sixth week after her first catamenial period. The breast had, during the whole of this time, been swollen and painful, but the left ceased to be so as the right inflamed. When I saw her the abscess was pointing, and it seemed to have involved the whole gland. It was opened by means of incisions radiating from the nipple, and treated on ordinary principles with tonics. In three weeks she was well. I have the notes of a like case which occurred in the right breast of a girl, aged 13, in whom the abscess and the appearance of menstruation were concomitant.

When the catamenia are established, and the breast gland has reached virginal developmental perfection, inflammation and suppuration are more common. It may occur as an acute or chronic affection, and possibly the latter is the more frequent. In the majority of cases no adequate cause for the trouble can be found; in some an injury has been clearly the cause. Under both circumstances the inflammatory action more commonly attacks the whole gland than a single lobe. In some cases it involves both glands.

Illustrative cases of this affection will possibly here best prove of value.

Case I.—Acute abscess in both breasts of a girl, aged 15:

Maria C., a healthy-looking girl, aged 15, who had menstruated for two years, always with pain, applied to me in June, 1865, with an acute abscess in her right breast of six days' formation. There was no history of a blow. The ab-

scess was opened and healed. Two years later, on April 22d, 1867, the girl came again with another abscess in her other breast of nine days' standing. This was treated by incision and tonics with a good result.

Case II.—Acute abscess in virgin breast:

Mary S., aged 16, came before me at Guy's Hospital on May 10th, 1858, with an abscess in her right breast, which had been discharging for one week, after acute inflammation of three weeks' standing. The abscess apparently involved half the gland. No blow or known cause could be assigned for its existence. The catamenia were regular. The opening, being insufficient for the free discharge of pus, was enlarged, and the cavity of the abscess washed out. In one month the girl was well.

Case III.—Chronic inflammation of both breasts in a virgin:

Emma S., a healthy-looking girl, aged 15, came under my care on July 7th, 1861, for chronic inflammation of both mammary glands. She had menstruated but twice, and it was after the last period, on March 29th, that her breasts began to enlarge. When seen the breasts were swollen, hard, hot, and painful. There was also some vaginal leucorrhœa. Fomentations were applied, and iron given as a tonic, and in the course of a few weeks the swellings had subsided.

In many cases a breast may inflame without injury or known cause, and recover by resolution without suppurating. In the one I am about to record, the inflammation never went beyond the œdematous stage, and then passed away. It is the only example of the kind that I have met with. For this reason I record it. The case explains the treatment that should be employed under similar circumstances.

Case IV.—Œdema of breast (inflammatory?); recovery:

Ellen O., aged 19, a single woman, consulted me on July 25th, 1864, for a great enlargement of her left breast, which had been coming on for four months. The whole gland was swollen, and the integuments over it were thickened and tensely œdematous, but neither red nor hotter than natural. No cause was assigned for the trouble. Some punctures were made into the tense skin, and much serum exuded. In one week all swelling had disappeared, and in a month the girl was well.

Inflammation of the Breast during Pregnancy and Lactation.—Inflammation of the breasts is most frequently met with in women who are, or have been, suckling. It but rarely takes place when the mammary glands are undergoing their physiological changes preparatory to suckling. When the breasts are preparing to discharge their normal function, there may, in the early months of pregnancy, be symptoms and signs of increased activity, but such rarely lead up to inflammation, unless stimulated by some external injury. Out of one hundred and two consecutive cases of abscess of the breast which have passed under my observation, seventy-nine occurred during lactation, two during pregnancy, and twenty-one in patients who were neither lactating nor pregnant. Thus, roughly stated, four out of every five cases of abscess of the breast occur in lactating women. The right breast seems to be more frequently affected than the left. In my own patients this was the case in the proportion of five to three.

Birkett states that this complication of lactation occurs chiefly in women who have given birth to a first or second child. That half the cases are associated with defective nipples, and another fifth with women whose nipples are unhealthy. Thus, he adds, "we have more than two-thirds of the cases of inflammation and its results complicated with, and probably excited by, malformations or diseases of the aggregation of the excretory ducts constituting the nipple."

The affection commences usually during the early or late months of lactation. In two-thirds of my own cases it occurred during the early periods, that is, in the first two months; and in two-thirds of these during the first month. In the remaining third it commenced during the last month. Mr. Birkett's statistics support these conclusions; fifty-eight out of his one hundred and sixteen cases having commenced during the fourth month after parturition, eleven during the second, and forty-seven during the later periods.

It would thus appear that inflammation of the breast is mostly in the early months due to some abnormality or affection of the nipple which renders suckling difficult, if not impossible, and in the later it is probably due either to protracted lactation, and to the exhaustion of the mother's general and of the breast's special powers to secrete milk, or to the abrupt

discontinuance of suckling from the death of the infant or other cause. In some of the cases I believe, with Mr. Ballard, that abscess in the early months is due to the searching of the child after milk before the gland is filled, in patients who have not sufficient power either to secrete milk or to resist the inflammatory process when once originated. In others, again, it is brought about by the injudicious use of a milk pump. In fact, whenever "the mamma, in its state of full expansion and perfect functional activity, becomes the subject of an interference, the result is very commonly a diffuse or nodular inflammation, and the formation of an abscess. A sudden stoppage of the milk soon after the lactation has been established is apt to produce inflammation, and the same result, or a degree of it, sometimes follows the weaning of the child after a long course of suckling. The disturbing cause, whatever it may be, acts upon the mamma when its function is at its greatest intensity, and the characteristic effect is inflammation and abscess" (Creighton).

Symptoms of Inflammation of the Breast.

As congestion of the blood-vessels is the earliest pathological change in the tissues of a breast that is about to inflame, so a greater fulness, with more or less induration of the affected part, is the earliest symptom. When the action is confined to a lobe of the gland the increased fulness will be local; when it involves the breast as a whole it will be general. This symptom of fulness will be readily detected on comparing the sound with the affected side. With this early symptom there may or may not be pain, unless uneasiness of the part, aggravated by movement of the arm, local pressure, or suckling can be called pain. But as the disease progresses, pain will soon manifest itself, and its intensity will turn upon the activity of the affection, or the nervous susceptibility of the patient, but more particularly upon the tension of the inflamed lobe or gland. This tension of the inflamed part is determined by the seat and amount of effusion poured out by the inflammatory action, or by the rapidity with which it has been effused.

With these early local signs there will probably be some constitutional symptoms, as shown by increase of temperature and the general disturbance of all the functions of the

body, which usually accompany every febrile action. At times, even in the very early stages of the affection, a sense of chilliness may precede the local trouble, and in rarer cases a distinct rigor may occur; but this latter symptom is more frequent in women who are suckling than in others, as in them the local congestion and inflammation of the breast is usually preceded by some local disturbance of the breast, and this local disturbance gives rise to rigor.

In lactating women local congestion of the breast is not uncommon. It may either subside without giving rise to any true inflammatory action, or pass on to acute suppuration, the ultimate issue of the case being much determined by the treatment it receives.

When it occurs, it is commonly called a lump, knot, or coring of the milk, and the lump or knot is essentially a lobe of the breast, which is choked with milk or its more solid constituents; this is commonly called lobal congestion. In more severe cases, all the lobes become thus affected, when the affection is called "lactic congestion."

If this local congestion of the breast does not pass on to inflammation, the skin over the gland will remain healthy, and beyond some fulness of its veins appear normal. The congested gland or lobe will, moreover, not be tender; indeed, it may tolerate manipulation freely, and find benefit from gentle friction, the friction apparently rendering the induration less marked, and relieving the congestion.

When this congested condition of the lobe or gland passes on to inflammation, the action is, as a rule, acute, and the induration of the part primarily involved spreads to the tissues around, and gives rise either to œdema, or to a brawny infiltration of the surrounding structures. When the inflammatory action spreads forward, the skin over the affected gland will become swollen, red, and more or less œdematous, tense, and painful, and with these local symptoms there will be the constitutional disturbance of inflammatory fever.

When the parts behind the gland are more involved than its coverings, there will be the same constitutional symptoms as have been described as attending the more superficial inflammation, but the local symptoms will be somewhat different, the difference being due to the presence of the inflammatory products behind instead of in front of the gland. From

this cause there will be less superficial redness and swelling, but a greater prominence of the breast (see Plate I. Fig. 2), and a sense of deep instead of superficial effusion. The progress of the affection will also probably be slower, and there may be more pain.

Should the inflammation continue, or rather not recede, and suppuration take place, many varieties of abscess may be met with, the position of the abscess being determined by many causes. Thus, there may be a local abscess confined to a single lobe, or a diffused one involving the whole or more or less of the gland (intraglandular abscess). In some cases the suppuration will appear to be superficial, and confined to the connective tissue between the gland and its coverings (superficial abscess); while in others it will be placed behind the gland between the breast tissue and the pectoralis major, and develop as a submammary abscess. In rare cases the abscess forms independently of the breast, as in the cases reported farther on, but in the majority the breast gland is involved in it. The progress of the affection under these different circumstances will vary, and this variation consequently claims some little attention.

Superficial Abscess.—When the abscess is superficial, the progress of the affection from the first will probably have been rapid, and although marked with the well-known local phenomena of inflammation, it is unusual for it to be accompanied by any severe pain, or associated with general constitutional symptoms. This mildness of symptoms is explicable by the fact that there is little tension upon the tissues, the skin readily yielding to the inflammatory effusion. Should, however, the inflammatory action involve a large proportion of the connective tissue which surrounds the mammary gland, there may be both severe local as well as general disturbance. In feeble and cachectic subjects this extension of mischief is very apt to take place, when from any cause a local inflammation has been started about the breast.

Under all circumstances a superficial abscess is prone to be followed by destruction of skin; when the suppuration is diffused, this destruction may be extensive. In patients of average power, a local inflammation terminating in suppuration may run its course, point, and discharge, rapidly, and with little loss of substance.

Intraglandular abscess is a far more serious trouble than the last variety, since its position is in one or more of the lobes of the gland itself; and it is to be remembered that these lobes are surrounded by a fibrous fascia, which when distended must give rise to pain. This affection is consequently attended from the first by comparatively severe local as well as constitutional symptoms.

The inflammatory action, moreover, since it involves deep structures, is comparatively slow in its progress, or rather, it is slow in developing the symptoms which are usually regarded as typical of a local inflammation; for to demonstrate these, the action which originated in the gland has to spread through its fibrous envelope to the surrounding tissues, and from them to the skin. Thus it is that in this form of inflammation many days, or even weeks, may pass in which there may be deep mammary swelling, intense local pain, and severe constitutional disturbance without local redness or any marked external evidence of cutaneous implication. These superficial palpable symptoms only show themselves when the inflammatory action has passed through the fascial envelope of the affected lobe of the gland, and secondarily involved its cutaneous coverings. The local pain in the early stage of this true mammary inflammation is often intense; it is the direct result of tension of the tissues into which the inflammatory effusion has been poured, and it continues until this has been reabsorbed, or the fascial covering of the affected lobe has yielded to the pressure from within and allowed the pent-up fluid to infiltrate the surrounding parts.

During the early progress of this affection the constitutional symptoms are correspondingly severe; indeed, within two days of the earliest discovery of an indurated and inflamed lobe of a lactating gland, symptoms of acute pyrexia may appear, and they are frequently associated with serious brain excitement and disturbance.

As the local affection progresses and tends toward suppuration, the local and general symptoms alter, although as to their intensity they rarely diminish. The severe burning lancinating pain which ushered in the trouble, changes into a heavy and distressing throbbing pain, and a rigor is superadded to the general condition of pyrexia. Indeed, from this stage of the affection, onward, periods of fever, rigors, and

sweating follow one another. The original seat of hardness in the breast steadily increases, until a greater part or the whole of the gland becomes equally involved; and the breast at this stage of the trouble feels large, and irregularly indurated, with the skin over it uninvolved, and the nipple often retracted. As the abscess progresses, the skin over the breast will become involved, showing redness and œdema; or even before, if the breast is carefully examined, the surgeon may detect at the original seat of induration a soft and painful spot, which to the experienced finger at once reveals the fact that the abscess is coming forward and will soon burst. As soon as the abscess has burst, relief to both local and general symptoms is at once experienced, and in the most favorable cases repair sets in, and recovery is not far distant. To illustrate this subject I append a few typical cases.

Case I.—Acute abscess of breast coming on during the seventh month of pregnancy:

Susan G., aged 26, the mother of four children, all of whom she suckled without trouble, came to me on January 15th, 1866, with an acute abscess in her right breast, which had been coming two weeks. She was then pregnant seven months. The abscess was treated by incision, and rapid recovery took place. She subsequently had a natural labor, and could suckle with the breast which had been affected.

Case II.—Abscess in the breast during the third month of pregnancy, with retracted nipple:

A woman, aged 37, the mother of one child three years old, came under my care on March 13th, 1867, with a tumor in her left breast of six weeks' standing; the nipple had been retracted three weeks; there were also enlarged axillary glands; she was pregnant three months. On April 2d the swelling becoming fluctuating, was opened, and pus evacuated. By May 9th the abscess had healed, leaving the gland indurated; the pregnancy continued to the end.

Case III.—Chronic abscess in the breast; recovery; two years later acute abscess in the same breast after pregnancy:

Eliza F., aged 32, the mother of four children, the youngest being two years old, came to me in September, 1867, with a swelling in her right breast of eight months' standing. She had never suckled with her right breast, as the nipple was

tender. The nipple had discharged a watery fluid up to the last month. The axillary glands were enlarged. The swelling was globular and semi-fluctuating.

The tumor was punctured and eight ounces of pus escaped; it was then laid open and rapidly cured. On January 4th, 1869, the patient returned with an abscess in the same breast of five weeks' standing which had followed labor nine months previously, though she had not suckled. This was opened later on and a good recovery followed.

Case IV.—Abscess in breast following inability to suckle on account of deformed nipples:

Henrietta D., aged 25, came under my care in January, 1879, with an abscess in her right breast. It had followed closely upon her confinement nine weeks ago, and was clearly due to her inability to suckle on account of depressed and deformed nipples. She had had plenty of milk. Both breasts inflamed, but the right alone suppurated, and burst, discharging a pint of pus. The left breast recovered by resolution.

Case V.—Intraglandular abscess following ulceration of the nipple:

Rosie F., aged 35, the mother of four children, the youngest being thirteen weeks old, came into Guy's in February, 1874, with an abscess involving the outer half of the left breast. She had not been able to suckle the last child with either breast on account of sore nipples. On admission, the nipples were extensively ulcerated, and in the outer lobe of the left breast there was clearly an abscess, as indicated by the presence of a deep fluctuating swelling and redness with œdema of the skin over it. There was likewise much pain and general disturbance. An incision was made into the abscess, which was then washed out and drained, and in about a month the woman was well.

It seems that with her first child, born fourteen years ago, she had an abscess in her right breast, which broke in six weeks, and slowly recovered. Her second child she nursed at both breasts. With the third the left breast suppurated.

Case VI.—Abscess in both breasts consecutive, retracted nipples as a result:

Rachel B., aged 28, a married childless woman, came under my care on November 10th, 1864, with a globular swelling in the centre of her right breast, and a retracted nipple. The

swelling had been coming on a week, and the nipple had become retracted during that period. The left nipple was normal. In a few days fluctuation was discovered, and the abscess was opened. Three months later the patient came again with the same condition of her left or opposite breast, and a retracted nipple. This likewise suppurated, and was treated. Both nipples were, however, retracted subsequently.

Case VII.—Abscesses in the virgin breast of a woman, associated with retracted nipple:

Charlotte C., aged 25, a single woman, came under my care on May 5th, 1885, with a swelling three inches by two and a half in the centre of her left breast, which had been coming for three weeks. It was hard and tender to the touch. The skin over it was natural. Nipple retracted, this retraction began with the swelling and shooting pain; no enlarged axillary glands. The tumor was supposed to be inflammatory, cold was applied by means of a Leiter's metallic coil for several weeks with advantage, the swelling diminishing; as soon as it was given up the swelling, however, increased, and an abscess formed, which was opened, drained, and cured.

Case VIII.—Nodular tumor (inflammatory) in centre of breast simulating carcinoma, following lactation, which disappeared under treatment:

Phœbe T., aged 30, a married woman, the mother of one child, now fourteen months old, came to me on October 21st, 1861, with a central tumor in her left breast which had been pronounced to be cancerous. It had been coming for five months, and had appeared three months after giving up suckling. It was not very painful, but was nodular. The nipple was natural. There was no redness, and but little pain. It was treated as one of inflammatory origin, and strapped up. Tonics were also given. In the course of about two months the swelling disappeared.

Submammary Abscess is, as a rule, still slower in its progress than the intraglandular; although, in exceptional cases, it may be comparatively acute. It is characterized by a remarkable projection of the breast forward from its thoracic attachments (Plate I., Fig. 2), and on manipulation, and more particularly on applying pressure backward upon the gland, a sense of elasticity and fluctuation will be detected, which is most characteristic.

The skin covering the breast at this time may be natural, and there will probably be no change in the appearance of the nipple. Pain will rarely be severe or constitutional symptoms serious. As the abscess spreads, and by making its way to the surface involves the integument, both local pain and constitutional symptoms become aggravated. The periphery of the gland will probably be the seat of pointing, and as a rule, the area of redness will be extensive; it may at first show itself in two or more local red patches, but these areas of redness will soon unite, and perchance spread in all directions; after a time the skin will give way by ulceration and sloughing, and the abscess discharge itself. The orifices of discharge are generally multiple. In exceptional cases the abscess discharges through the gland, when the orifice is placed near the sternal side of the nipple, where the gland is the thinnest.

Case I.—Acute submammary abscess after delivery; death from lobar pneumonia:

Alice P., aged 22, was admitted into Guy's Hospital on February 11th, 1875, with a submammary abscess of her left breast. It had come on after her confinement six weeks previously. The left breast was not apparently larger than the right, although it stood out from the chest in a very prominent way; deep fluctuation beneath the breast was to be felt. An incision was made into the abscess at the lower margin of the gland and much pus evacuated; in a few days a second incision was made higher up. Chest symptoms soon appeared, with great elevation of temperature, and the patient sank. At the *post-mortem* it was found that the woman had died from lobar pneumonia of the left lung; that a large abscess cavity existed between the left breast and the pectoral muscle; and that the breast itself was quite healthy. All the other viscera were healthy.

When this affection has been allowed to run its natural course numerous sinuses are often present, their orifices being situated around the margin of the gland.

Case II.—Sinuses in both breasts following submammary abscesses two and a half years previously, treated by binding the arms to the sides:

Mary M., aged 43, the mother of five children, the youngest being four years old, came under my care on February 21st,

1861, with both breasts riddled with sinuses discharging pus, the orifices of the majority of the sinuses being at the periphery of the breasts. These had existed for two and a half years, and had followed acute suppuration of both glands after prolonged suckling. No treatment had been successful. The sinuses were syringed daily, and the breasts strapped. Tonics were also given. Improvement followed, but no cure, until the arms were bound to the sides to prevent muscular movement, after which a rapid recovery ensued.

Treatment of Inflammation of the Breast.—Inflammation of the breast is to be treated upon the same principles as inflammation of any other organ; the object of the surgeon being, if possible, so to check the action in its early stage as to bring about a recovery by resolution, and where this desirable end is not to be secured, to limit the amount of mischief in the gland, and to prevent, when suppuration has taken place, more damage to the gland and surrounding structures than is unavoidable.

It must, however, always be remembered that the breast gland may inflame under very different physiological conditions, and that the treatment of an inflamed gland in a state of physiological inactivity must differ in a degree from the treatment of one either preparing for lactation, as in pregnancy, or in full physiological action, as during suckling.

The puerperal or non-puerperal condition is a consideration which should therefore ever weigh with the careful surgeon, and in the consideration of its treatment it consequently seems to be wise to divide cases of inflammation of the breast into two classes.

The first including such as occur in children and women quite independently of the puerperal state.

The second those that are associated with, or follow, either pregnancy or suckling.

In Infants.—Inflammation of the breast in the non-puerperal state, as it occurs in infants, should not give rise to any serious trouble; and it may probably be said with truth, that it would hardly ever occur, if the breast had not been squeezed, pressed, or damaged, by the fingers of rough nurses who are imbued with wrong impressions.

Should, however, any inflammatory action show itself, the

application of a pad of Gamgee tissue or absorbent cotton dipped in warm lead lotion, will, as a rule, cause it to disappear without suppuration. To prevent a recurrence of the action, the breast should be protected with cotton wool, and due attention paid to the dresses, that they should not press or irritate the part.

When suppuration has taken place the abscess should be opened as soon as it has formed, the puncture or incision being made in a line radiating from the nipple. The abscess cavity should be well washed out with iodine water, that is, a lotion composed of about two drachms of the tincture or one of the liquor iodi to a pint of water; and some simple dressing should be subsequently applied, such as a piece of folded lint saturated with a mixture of terebene (one part) and olive oil (four parts); and bound over all a small sheet of Gamgee tissue. With such treatment the abscess will heal. When burrowing has taken place, and the contents of the abscess do not pass away readily, the cavity should be washed out daily with the iodine water; in exceptional cases a drainage tube may be required.

In Girls.—When inflammation attacks the breasts of girls at the age of puberty, when they are in a state of evolution, the local application of warm lead lotion, with or without the addition of opium in solution, in the proportion of five grains of the extract to an ounce of lead lotion, will always be beneficial; when the action is high, saline purgation is useful, and when the patient is weak, tonics may be called for, quinine being the best. As the acute stage subsides, the local application of the extract of belladonna diluted with glycerin, or rubbed down with vaseline or lard in the proportion of ʒ i. to an ounce, soothes the pain, and expedites recovery. In painful breasts, in which inflammation may be expected, this local application of belladonna may be all that is called for. In all cases of inflammation the arm is to be fixed to the side, to check action of the pectoral muscles upon which the breast rests, and the inflamed mammary gland should be supported. In severe cases, where suppuration is threatened, the horizontal position should be maintained.

In Women.—Inflammation, as an acute affection, when it attacks the breast of women who are neither pregnant nor lactating is usually the result of injury. It occurs, however, without any such cause. It is, as a rule, periglandular;

when intraglandular it is usually chronic. It is to be recognized by the same symptoms as have been described above, and it should be treated on like principles. When it first appears, it may, however, be checked by the local use of cold, applied as an ice-bag, or by what is better, Leiter's metallic coil, a method of treatment which is of great value in the treatment of all local inflammations, but which is not applicable in the case of pregnancy and lactation. Should suppuration occur, it is to be dealt with as an ordinary abscess; but the gland not being in an active physiological condition is rarely the seat of suppuration.

In Pregnant or Lactating Women.—Inflammation of the breast in the pregnant or puerperal woman is always a more serious affection than when the same trouble affects a woman differently situated; for women in the conditions alluded to are particularly sensitive, and are open to impressions to which others, who are neither pregnant nor lactating, are not exposed. Inflammation, under these circumstances, attacks a gland which is physiologically active, and consequently more prone to become the seat of inflammation under the influence of any traumatism or disturbance of its functions.

The earliest symptom of inflammation of a breast physiologically active is local induration with more or less pain; and this induration indicates a lobular congestion of the gland; indeed, this stage may be described as the "congestive." There will not be any redness, œdema of the skin, or constitutional disturbance of any importance: gentle manipulation of the gland will not be resented.

In the pregnant woman this "congestive" stage, if not due to injury, must be explained by some local disturbance to the evolution of the gland, giving rise to congestion of the vessels and blood stasis, which, if not relieved, will pass on to active inflammation. To relieve it, the horizontal posture, as a means of helping the circulation through the breast, support of the gland by bandage, and gentle friction with pressure of the gland toward its nipple, are of great value; indeed, by these means alone, aided or not by some saline purgative, the symptoms will often subside and leave no mark behind.

In the lactating woman, although the same treatment may be beneficial, the surgeon should examine with care the condition of the nipples, to see if there is any obstruction to

any of the ducts, or irritation about their orifices, and at the same time he should examine the lobules of the breast to see if any are choked with milk, in order that their distention may be relieved, either by the manipulation already described or by some mechanical means. When suckling can be allowed, gentle friction in addition may be sufficient; where this is impossible, some appliance for drawing off the milk should be carefully used. The breast pump I look upon with no favor, since I am convinced I have seen much harm follow its use by injudicious hands. When it is employed, it must be used by the surgeon, and not left to a nurse, unless she be both skilful and judicious. Where the nurse is intrusted with the duty of drawing the breast, the least dangerous instrument is a tube with a mouth-piece for the nurse, or, indeed, the patient, to draw, fastened to a shield to press over the nipple, with or without a small reservoir between to hold the milk. The patient is hardly likely to hurt herself by suction, and the withdrawal of but a few drachms of milk from an over-distended lobule will give relief to pain, as well as to the congestion, and tend to check the inflammatory action. The application of pressure to the breast by means of strapping, at this stage of the trouble is often beneficial. The nipple should be left uncovered, as suckling may be useful.

When there are external signs of inflammation, such as redness; or constitutional symptoms, such as pyrexia, to indicate true inflammatory action, the application of the lead and opium, or lead and belladonna lotion, applied warm, gives great comfort and does good. The patient should under these circumstances maintain the horizontal posture, and the breast should be carefully supported, either by cushions or bandages; one of the former placed between the arm and chest on the affected side is probably the most convenient. As the arm is not to be used, it is well, therefore, at the same time, to bind it to the side with the cushion in position.

Saline aperients are often of value, but they must be judiciously ordered, since they have a lowering tendency, and patients with inflamed breasts are rarely of the strongest build; indeed, with them, as a rule, tonics are indicated, such as quinine, bark, mineral acids, or even iron. When the inflammation occurs toward the end of suckling this is always the case; when it takes place in the early months, as a result

of sore or malformed nipples in milking mothers, purging is of great value. When the external symptoms of inflammation are marked, the constitutional symptoms acute, the powers of the patient good, and the causes of inflammation in the nipple have made suckling impossible, the local application of from twelve to twenty leeches is often of striking benefit; they should not, however, be placed over the seat of redness, but near the margin of the gland on the affected side; by this means the vessels supplying the gland are the better relieved.

During the whole course of treatment the breast must be supported, and where pressure can be tolerated by means of strapping it should be applied.

In every case of inflammation of the breast in a lactating woman, its probable cause should be made out, and treatment based upon it. When the action is due to retained secretion, the primary indications for relieving the congested breast of milk are clear; and the secondary, for subduing the inflammation, which is evidently the result of over-distention, are not doubtful. When it occurs toward the end of lactation, and is too probably the result of over-suckling, associated with general weakness of the body and want of power in the gland to do the work demanded of it, the indications are likewise clear; to stop the cause of trouble by prohibiting suckling, and by medicine, food, and hygienic means to improve the condition of the patient, to enable her by natural power to arrest the disease. When the inflammation is brought about by retained secretion, active measures may be taken with a good prospect of success; when from over-suckling and debility, the conditions under which the inflammatory action starts are most unfavorable, since the subjects of the trouble, and the glands themselves, from over-nursing and exhaustion, show little resistance to inflammatory changes, and time is wanted for the remedies to take effect. Under such circumstances suppuration is almost sure to ensue.

Treatment of Abscess of the Breast.—When suppuration has taken place in a breast, as elsewhere, the soundest surgical treatment is to evacuate the pent-up pus as soon as possible; by so doing the extension of the trouble is prevented, much pain is saved, and the course of the affection is curtailed. The only exception to this rule is where the suppuration is

subcutaneous and very limited, and where the surgeon cannot determine the right point for puncture.

To leave a large subcutaneous abscess to break, is to allow large portions of skin to become underminded and consequently to die. To let a true intraglandular abscess take its course and find its way to the surface, is to waste time, cause much needless pain to the patient, and postpone recovery, and the same may be said of the submammary abscess, for in it, if the abscess is left alone, there must of necessity be burrowing of matter in all directions, and as a result the formation of sinuses, and much unnecessary damage to the breast and parts around. When the abscess is opened, the incision into it should be free, and it should without exception be made in a line radiating from the nipple. By following this line the risks of interfering with the ducts of the gland, and of thus adding to the chances of the gland becoming useless, are greatly diminished, and a reasonable hope may be entertained, even in the worst cases, that the gland may subsequently be able to resume its functions.

When the abscess has been opened, and it is to be assumed freely, so that its contents may readily escape, the abscess cavity should be irrigated with some antiseptic lotion, such as that of iodine, and the walls of the abscess allowed to collapse; pressure should then be applied by means of strapping to keep the walls of the abscess in apposition, and the breast supported; the line of incision should be kept uncovered, and carefully guarded by some antiseptic dressing, to prevent decomposition, such as strips of iodoform gauze dipped in a mixture of terebene one part, olive oil three parts; or carbolic oil one in eighty; and a small sheet of Gamgee tissue, or a wad of absorbent cotton should be fixed over all to absorb the discharge. In some cases, when the pus drains from a deep cavity, a drainage tube may be employed. The incision into the abscess should always be so arranged as to assist the drainage of the abscess, and the cavity of the abscess should be washed daily with iodine water, or some other antiseptic solution, either of carbolic acid, 1 in 80, or boracic-acid lotion, ten grains to the ounce.

In a submammary abscess an incision should be made as soon as a diagnosis of abscess has been formed. The opening should also if posssible be made at the lower or outer border

of the breast, and a drainage tube introduced after the cavity has been well irrigated. The breast should likewise be steadily fixed, by strapping and bandage, to the thorax, so that its movements may be prevented and the walls of the abscesss kept firmly together. In some cases of submammary abscess, or of sinuses following abscess, it is necessary, so as to get a good result, to prevent the movement of the pectoral muscle by binding the arm to the side. In a case already quoted the benefit of this treatment was well exemplified, but in the following it was more striking.

Case I.—Sinuses about breasts following deep-seated suppuration three and a half years previously, in a young single woman:

Miss M. U., aged 23, consulted me in 1875 for sinuses which riddled both breasts, and likewise the submammary tissues. They had existed on the right side for three and a half years, and on the left for three years. They had followed acute inflammation which had come on without any known cause. Every kind of treatment had been employed without success. I simply strapped up the breasts, leaving the orifices of the sinuses open, dressed the wounds with terebene oil, and bound the arms to the sides to prevent movement of the pectoral muscles. In one month the patient was well.

Tonics are almost always required in all these cases, and of these quinine is the best. Iron when it can be borne is also of value. Good food, with stimulants carefully administered, and good air are likewise essential. When the abscess is quite local, and the general condition of the patient good, nursing may be continued so as to keep the breast free from fulness, although it is not to be recommended; but when the suppuration involves more than a lobe, it must be forbidden as much for the infant's as for the mother's sake.

When sinuses are left after suppuration, they may generally be healed by the careful application of well-applied pressure by means of strapping to insure immobility of the parts about them; when they are of some standing, the injection of a lotion of chloride of zinc of from 5 to 10 grains to the ounce is most beneficial; when they are superficial they should be laid open, and treated as open wounds.

When milk fistulæ are present, that is, when the sinuses following an abscess discharge milk, the same kind of treatment is to be adopted as has been just described for sinuses; their cure is, however, always troublesome; indeed, it is not to be looked for until the breast has ceased to be a secreting organ. When the milk has "dried up," the fistulæ will probably heal up with it, but not before.

The induration which is left after inflammation of the breast will slowly subside as the health of the patient improves, and even after the most extensive suppuration there is a reasonable hope that the breast may so recover its normal condition as to allow of suckling in a later pregnancy. Should there be any malformation, retraction, or disease of the nipple, this result is not, however, to be looked for, but under other circumstances it may be anticipated.

To guard against congestion and inflammation of the breasts of pregnant women, who from local or general bodily condition cannot or ought not to nurse, pressure is by far the most reliable means. This may be applied directly after labor in the form of a chest bandage, or by means of strapping, well adjusted; the pressure mechanically preventing the flow of blood into the breast, which of necessity precedes secretion.

When the stage for pressure has passed, and that of tenderness and congestion reached, the local use of belladonna, diluted with equal parts of vaseline or glycerin, is of great value. Saline purgatives administered with discretion help toward the desired end.

CHAPTER V.

CHRONIC ABSCESS OF THE BREAST.

In a clinical exposition of diseases of the breast, it is clear that chronic abscess of the gland should be considered apart from the more acute forms of inflammation; since examples of this affection differ much from the more acute troubles in their clinical history and symptoms, and are frequently mistaken for new growths, such as cancer. They are met with in women at all periods of life, and attack the single as frequently as the married, and the sterile as often as the prolific. They follow at times some blow or injury, and are occasionally associated with lactation. More frequently, however, they form without any known exciting cause, and are very insidious.

The symptoms are much those of chronic lobular inflammation, although, if possible, less well marked. They are chiefly those which are attached to a local swelling, slowly and insidiously increasing with little or no marked pain. The swelling from the first seems to be part of the breast, and to involve it as an infiltration. In the early stage no other symptoms exist. Later on, there may or may not be œdema and external signs of inflammation; but these points will best be illustrated by cases.

Case I.—Chronic abscess in the centre of the breast of a married childless woman following a blow; nipple retracted:—

Sarah M., aged 25, a married childless woman, applied to me on December 31st, 1863, for a swelling which occupied the centre of her left breast. It had been slowly coming, and had appeared soon after a blow, which she had sustained eight months previously. There had been little or no pain attending its formation. When seen the breast was universally enlarged, and formed a flattened globular swelling, in the centre of which was a retracted nipple. The nipple before the swelling appeared had been quite natural. The tumor was very

hard and slightly tender on manipulation. No sense of fluctuation could be detected in it. A needle was introduced into the swelling for diagnostic purposes, and when pus exuded, a free incision was made into the gland, and several ounces of greenish pus evacuated. A speedy cure ensued.

Case II.—Chronic abscess in the breast of a single woman, with retracted nipple, simulating cancer:

Ellen A., aged 56, single, applied to me in 1865 for a swelling which involved the whole of the left breast, associated with a very retracted nipple. The breast was very hard, and the trouble had been coming for seven months. The axillary glands were normal. The case looked like one of cancer. In two weeks, however, some signs of fluctuation were felt, and on the introduction of a needle for diagnostic purposes, pus escaped. The abscess was, therefore, opened, and a cure ensued. The retraction of the nipple had been congenital.

Case III.—Chronic abscess in the left breast of a single woman:

Jane E., aged 32, a single woman, came to me in 1865, with a large abscess, the size of a cocoanut, in her left breast. It had been coming for five months without any known cause, and with hardly any other local symptom than swelling. I tapped it, and drew off sixteen ounces of pus. I then incised and drained it, when a rapid recovery ensued.

Case IV.—Chronic abscess in the centre of the breast, with retracted nipple, following pregnancy:

Mary R., aged 41, a married woman, the mother of nine children, all of which she suckled except the last, came under my care on August 25th, 1864, with a large central indurated swelling, occupying the right breast, and a very retracted and depressed nipple. The swelling had been gradually coming for nine months during her pregnancy, and during this time the nipple retracted. She was confined at the natural term, and did well. She did not wean the child. When seen the skin over the swelling was adherent to the gland, a week later it was somewhat redder than normal, and, in two weeks some evidence of pointing was discovered near the nipple. An incision was consequently made deeply into the gland, evacuating pus, and a rapid recovery followed.

Case V.—Chronic abscess in the breast, unassociated with lactation, discharging through the nipple:

Harriet B., aged 40, the mother of four children, the youngest being eleven years old, came to me in June, 1865, with an abscess in the centre of her right breast, which had appeared without any known cause about ten months previously, and had discharged from the nipple three weeks. The breast was large and tender, and pus flowed freely from the nipple. Tonics were given, and pressure was applied to the breast by strapping. In one month all discharge ceased, and some thickening of the breast alone remained, which eventually subsided.

Case VI.—Chronic abscess in the breast of a married woman, aged 64, without known cause:

Hannah K., aged 64, a married childless woman, consulted me on October 14th, 1859, for an abscess in her right breast, which had been discharging from the nipple, and also from an orifice below the areola for two weeks. A swelling had existed in the breast for about three months previously. It began as a swelling that was not very painful, which slowly increased, and then discharged. It was cured by a free incision and drainage, aided by tonics. The case was thought to have been one of cancer, and on that account was sent to me.

Case VII.—Chronic abscess of the breast, of four months' standing, in a single woman, mistaken for cancer; excision of gland; recovery:

A. S., aged 50, a single woman, came into Guy's Hospital with a central tumor of the right breast, which had been coming painlessly for four months, and was associated with a retracted nipple. The skin over the breast was healthy, and the lymphatic glands were not enlarged. The surgeon under whom the case was admitted took it to be one of cancer, and consequently removed the breast. Its true nature was then discovered.

Case VIII.—Abscess in the breast with retraction of the nipple, puckering of the skin, and swelling, in a single woman; simulating cancer:

Leonore W., aged 39, a single woman, came under my care on November 22d, 1866, with a swelling the size of a large walnut in the upper part of the left breast, which had been coming for months, with a nipple which was completely retracted, and with the skin over the tumor puckered and fixed to the parts beneath. The swelling was hard, and situated in the

gland itself. These symptoms suggested a carcinoma. On going into the history of the case, it was elicited that the nipple had been retracted from birth, and that the puckering and adhesion of the skin were due to the cicatrix of an old abscess which she had had twelve years previously. In the course of a few weeks the tumor softened, and its true inflammatory nature was revealed. It was opened, irrigated, and cured.

Case IX.—Chronic abscess in the breast of a pregnant woman with retracted nipple, and enlarged axillary gland; recovery:

Mrs. R., aged 37, a married woman, with one child three years of age, came under my care, in May, 1867, with a swelling which occupied the centre of her left breast, of six weeks' standing, and which had come on without any known cause. The nipple for three weeks had been retracting, and when seen the axillary glands were enlarged. The skin over the breast was healthy, and manipulation gave rise to some pain; no fluctuation could be felt in the swelling. The diagnosis of the case was obscure. A month later it came out that the woman was pregnant about three months. The tumor then enlarged, and was indistinctly fluctuating; an exploratory puncture was consequently made into the swelling, and, as pus escaped, this was followed up by a free incision; a good recovery ensued.

Case X.—Chronic abscess involving the whole breast, with retracted nipple; incision; recovery:

Eliza W., aged 34, came under my care on June 6th, 1867, with a general infiltration and enlargement of her right breast, of nine months' duration. The nipple was completely retracted, and the skin over the breast seemed to be fixed to the gland beneath; to the eye the skin looked natural. The tumor indistinctly fluctuated. The swelling was said to have followed a blow. This woman had been confined in October, 1865, and was suckling in September, 1866, when she received the blow. Tonics were given. Later on, fluctuation having become distinct, an incision was made into the centre of the gland, and pus evacuated, after which recovery took place.

Case XI.—Abscess in an inactive breast, with retracted nipple; simulating cancer; cured:

Ellen D., aged 39, a married woman, the mother of three children, the youngest being eight years of age, came under

my care on April 1st, 1867, with a swelling in the axillary lobe of her left breast, and a retracted nipple; the base of the nipple being drawn toward the axilla. The swelling had been gradually coming for three or four months without any known cause, and was the seat of a sharp pain. It was vaguely globular and doubtfully elastic. The axillary glands were sound. Its true nature was uncertain, and for diagnostic purposes an incision was suggested, but consent for this was not obtained. In two weeks the skin had become glued to the parts beneath, and some slight redness appeared; an incision was consequently made into the breast, and some ounces of pus evacuated. In three weeks the patient was well.

Case XII.—Chronic enlargement of the breast with retracted nipple, simulating cancer, chronic abscess (?), excision; cure:

Mrs. W., aged 64, consulted me in November, 1875, for some enlargement of her right breast, which had been coming on for about four months. The nipple was retracted, but this condition was said to have been congenital. There had been but little pain in the breast during its enlargement. When I saw her the breast was generally enlarged and indurated. The nipple was completely retracted. The skin over the breast was natural, and there were no enlarged axillary glands. I regarded the case as one of carcinoma, and advised excision. The operation was performed, and a rapid recovery ensued. The patient, now nearly twelve years after the operation, is quite well. On making a section of the gland through the nipple after its removal, a quantity of yellow purulent fluid escaped and scattered itself over everything. It had been ejected from a cystic cavity, which occupied the centre of the gland, and the walls of the cavity looked as if they had broken down. With the naked eye examination I was in doubt as to the cavity being caused by a softened cancerous tumor, or to an abscess. Dr. Goodhart consequently examined the growth, and reported as follows:

"I have examined the breast tumor you sent to me. Without venturing to be too positive, I think it is only inflammatory; at any rate, all the appearances met with are explicable on that hypothesis. The breast tissue is still quite distinct and healthy looking, but in places a large number of granulation-like cells are found crowded into the fibrous tissue, nor-

mal to the part. There is no variety of shape, and no excess or easy displacement (milky juice) of cellular elements. Outside the breast tissue proper the fat is undergoing definite change, not that of infiltration, but of absorption of oil, and crystallization of margarine, etc., leaving behind cells which at first look suspicious from their size, but which, I believe, are nothing more than fat cells gone into training, and having disposed of their superfluous oil.

"The naked eye appearances are quite those of a chronic inflammatory tumor; healthy breast swollen out, in fact, not infiltrated.

"I shall be glad to know any result that may hereafter declare itself, and in the mean time shall believe that it will not recur."

Case XIII.—Tumor in the breast of a married prolific woman, twelve years supposed to have been a cancer, which suppurated and was cured:

In March, 1860, a married woman, aged 40, the mother of six children, whom she had suckled, the youngest being eight months, was admitted into Guy's Hospital under the care of the late Mr. Hilton, with a tumor the size of an egg in her right breast, which had been steadily growing for twelve years. It was clearly in the gland, irregularly nodular and hard. The skin over it was glued to the tumor beneath. The nipple was natural, axillary glands free. The tumor first appeared twelve years before, when the woman was twenty-eight, and had increased after each confinement and period of lactation. It was supposed to have been carcinoma. While under observation, however, it inflamed, and discharged healthy pus. A free incision was subsequently made into it, and a rapid recovery followed. This tumor could hardly have been an inflammatory one from the first. It might have been at the beginning a galactocele or cyst which subsequently suppurated. When the notes of the case were taken by me in 1860, no reasonable explanation of the case could be found.

These cases, which are well worth studying, and on that account have been reported, are enough to indicate the different courses a chronic abscess may take; the different symptoms to which it may give rise; the difficulties that may be experienced in forming a true diagnosis; and lastly, the errors of treatment that may be made.

They are enough to teach the surgeon the necessity of caution both in forming an opinion, and in dealing with the case when the diagnosis is not sure. They indicate the propriety of making an exploratory puncture or incision into any tumor whenever there may be the slightest doubt as to its nature, a lesson which the consideration of tumors themselves will help to enforce.

Inflammation and Suppuration of the Male Breast.— The male breast may inflame and suppurate in the same way as the breast has been described as doing in the female, although examples are not common. Injury may, in some cases, be the cause, but in others no definite history of such can be obtained. Indeed, in the male as in the female, inflammation may apparently originate apart from anything of that nature. I find, however, from my notes of twelve cases, that the affection in eight was attributed to local pressure or injury. At puberty a boy's breast may fill up, and become as tender and irritable as a girl's; and then, either by treatment or without, get well, and no longer be a source of trouble. During young adult life the same affection may occur.

In other cases the inflammation may follow the congestive stage, which probably best expresses the condition of the breast called irritable, and this inflammation may end in suppuration. I have seen several examples of this.

All these cases are to be diagnosed and treated in the same way as when they occur in women.

The following brief notes of some of the cases which have passed under my care will probably best illustrate the whole subject. Many I reported in 1868.[8]

Case I.—Irritable breasts in a boy:—

Timothy W., aged 15, a compositor, came under my care in 1865, with swollen, congested, tender, and painful breasts. Both glands were alike, and the symptoms had been coming on for months. The boy's health was good, and no history of injury could be obtained. Fomentations locally were ordered, and tonics prescribed. In one month the boy was well.

Case II.—Chronic inflammation of both breasts in a man; retracted nipple:

George W., aged 31, came to me on January 19th, 1866, with an inflammatory induration of both breasts, enlargement of

the glands in the left axilla, and retraction of the left nipple. The affection had been coming on for six weeks without any assignable cause. Under the use of the extract of belladonna applied locally, and tonics, the pain became less, and in six weeks the left breast returned to its natural size. The right breast was more obstinate, but ultimately recovered with a retracted nipple.

Case III.—Abscess of the breast after injury:

W. H., a lighterman, aged 31, came under my care on June 23d, 1862, for some affection of both breasts. It had been coming on for one week, and when seen, both glands were enlarged, tender, and painful. He believes he struck his left breast with an oar three days previously. Fluctuation was detected in the left gland, and consequently an exploratory puncture was made from which pus escaped. The wound was then enlarged, and the abscess cavity irrigated and drained. Tonics were given, and in two weeks the man was well.

Case IV.—Large abscess in male breast; recovery:

Joseph K., aged 21, a healthy smith, came under my care on January 3d, 1858, with an abscess in the right breast, the size of a large orange. It had been coming for two weeks, and had given rise to much pain. No assignable cause was given for its origin. Fluctuation was readily detected in the tumor, which was deeply placed in the gland. The skin over the gland was healthy. A free incision was made into the abscess at its lower and outer surface, and several ounces of pus evacuated. In three weeks, with tonics, he was well.

CHAPTER VI.

HOW TO EXAMINE A BREAST—FUNCTIONAL DISORDERS OF THE BREAST.

The Examination of a Breast.—In examining a breast with diagnostic intentions, the whole gland should be well in view, and the patient should be either lying down (the most desirable position) or reclining well back in an easy chair. The hand, made warm, if necessary, by dipping it into warm water, should then be placed flat, with its palmar surface upon the breast, and the gland manipulated gently with fingers and thumb in every part. By these means, if an isolated tumor be present, or any local infiltration of the breast or of one of its lobes exists, its presence will be detected; for a tumor growing in the breast, or infiltrating it, would at once manifest its presence to the touch as a decided projection forward. The surgeon should not grasp the breast between his finger and thumb, or raise it by his grasp from the pectoral muscle, until the former examination of the gland has been completed; for in such an affection as the irritable mamma, the gland by such a method of examination would feel like either a round or flat tumor beneath the skin, under which circumstances the idea of tumor would be excited in the surgeon's mind, whereas when the whole gland is pressed flatly against the chest, with the palmar surface of the surgeon's fingers, no such apparent tumor or hard infiltrating mass will be perceptible. Under these local circumstances, and with the other general symptoms to which attention will be drawn, the diagnosis of this affection can usually be correctly made.

Irritable Mamma and Chronic Thickening of the Breast.—By an irritable breast is meant a gland which is hypersensitive, the skin as a rule sharing this increased sensibility. The breast, at the time when the pain is present, is also usually full; that is, when compared with the unaffected gland, it is larger, firmer to the touch, and the skin covering

it is more vascular, as indicated either by redness from engorged capillaries, or by filled veins. The pain varies in different cases, and at different times in the same case. It may be so severe as to make the patient dread the slightest touch, even of her dress; and the examination of the breast by the surgeon may induce either a general suffusion of the patient's face and neck, or give a shock to her circulatory system, so as to bring about almost a state of fainting, as indicated by sudden pallor, nausea, and a feeble pulse. The pain is not always only local, it spreads in some cases up the neck, round the side, or down the back or arm.

Pressure upon the middle or anterior branches of the intercostal nerves, as they pass through the intercostal muscles to supply the gland, excites severe distress, and it may be noticed that now one, now another, branch will be involved. The seat of pain in the breast itself always corresponds to the branch of nerve affected. The pain is usually paroxysmal, and it may at one time affect a single breast, and at another both; or it may leave one and attack the other, and these alternations may even occur in the course of a day.

This hyperæsthesia is more common in its extreme form in young girls and single women under twenty-five years of age, than in others of a maturer age; while the thickening of the gland, and minor degrees of increased sensibility occur more frequently in single middle-aged, or married sterile women from twenty-five to forty-five years of age. In every case of either young or middle-aged subjects, some derangement of the functions of the generative organs will be discovered on investigation, and the catamenia will be either profuse, painful, irregular, or absent. There will probably be some leucorrhœal discharge between the periods. With this disordered condition of the generative organs, the other functions of the body will be generally out of order, and the nervous system will be excitable from pain and want of rest. This local affection is never associated with any of the usual external indications of what is called inflammation. The skin, if more full of blood, is never red as in a local inflammation; and the temperature of the breast or body is not elevated. No tumor, moreover, is ever felt in the affected breast when the hand is placed flat upon it. The diagnosis of this trouble should consequently in young women never be difficult. In women be-

tween thirty and forty-five years of age, where the nerve element is less and the changes in the breast more marked, difficulties of diagnosis may be experienced. Indeed, a surgeon in even moderate practice is not likely to pass many weeks without being consulted by a patient who has this affection, who thinks, or has been led to think, that she is the victim of some cancerous or other growth.

Treatment.—This affection requires general as well as local treatment, since in the majority of cases it is secondary to general causes. What irregularities connected with the catamenia exist should consequently be attended to, and should there be any suspicion of indulgence in depraved habits, means must be adopted to correct them. General means to improve the bodily health of the patient are always called for, and mild aperients, to keep the bowels open; tonics are, as a rule, useful, quinine or bark and iron being the best; where pain is a real source of trouble, sedatives may be combined with the tonic. Plenty of good air and gentle exercise should be prescribed.

The local treatment resolves itself into protecting the breast from manipulation and injury, by covering it up with a belladonna plaster, or belladonna as an ointment fixed on with strapping, so as to support the breast. When pressure such as this cannot be tolerated, the local application of belladonna ointment and cotton wool should be tried. In exceptional cases the warm lead and opium lotion gives relief; or when an attack of pain occurs, the application of a piece of spongio-piline, upon which a solution of opium has been poured, is likely to give great relief.

Functional Disorders of the Mamma.—The function of the breast is to supply milk for the newly born infant; and in girlhood the gland develops up to a certain point *pari passu* with the pelvic genital organs. But though growth may continue, it is probable that development does not much advance until the time has come when girlhood passes into womanhood. When this period of life has been attained, the breast gland, with the genital organs, undergoes further, although still not yet complete, development, since absolute ripeness waits on pregnancy. As soon as this event occurs the breast may be truly said to take the last step in the way of preparation for its perfected functions, so that it may be ready when the full

period of pregnancy has been reached to do the work for which it was intended.

The development of the gland, however, although it is in a sense intermittent as regards its pace, is carried out on the same lines as were laid down for its physiological progress even in the embryo; so that when the breast passes on from that of girlhood into that of womanhood, it does so simply more rapidly than it did before; and when, under the stimulus of pregnancy, the process of development goes on up to its stage of perfection there is still but one continuous process of evolution.

"The continuous and useful production of milk," says Creighton in his suggestive work on the breast, "which alone constitutes the function from the physiologist's point of view, is not the essential or primary activity of the organ, but a mere prolongation of its evolutionary force at its highest point."

This evolutionary force may at times act irregularly and oddly, and then there comes disease. At one time, even when the gland's true physiological function is naturally called for, there is no response, and a more or less true want of milk secretion (agalactia) is met with. Under other circumstances the secretion may be so excessive, that it either flows away (galactorrhœa) or the breast becomes so congested with its own secretion as to give rise to serious trouble, to which attention has been already drawn. In rarer cases, the breast of a girl, before womanhood, so far as the pelvic genital organs and general physical development are concerned, may actually secrete milk, as may the breasts of unmarried women. Indeed, cases have been recorded in which the breasts of old women have secreted what has been described as milk, and still rarer ones where the breasts of men have been said to have done the same.

These anomalous cases need not claim much attention in a practical work such as this. References to works where they may be found will be given on another page.

Agalactia.—When a want of secretion exists, the fault may be either in the gland itself or due to some fault in the general economy. When in the gland itself, there may be some organic imperfection in its development, as shown by smallness in size; some wasting of the gland structure after either

an attack of inflammation and suppuration, or some prolonged antecedent lactation; this latter cause, as it were, so exhausting the secretory power of the gland as to cause its atrophy.

On the other hand, the breast may be a large one, and the subject of what is called hypertrophy, though wrongly, and yet secrete no milk. (See Hypertrophy.)

Occasionally the pressure of new growths in the gland induces atrophy, but such a result is not common; for breasts, the seat of cancer, sarcoma, and adenoma, often secrete freely. When the cause of want of milk secretion is due to general and not local conditions, it is from deficiency of constitutional power, temporary or permanent, brought about by either functional or organic disease.

Occasionally the administration of large doses of iodine or of potassium iodide have been said to produce wasting and agalactia; I cannot confirm this observation from my own experience.

At times the breast gland may be healthy, and yet not quite prepared for suckling when delivery has been accomplished, some delay in the appearance of the secretion from some local or general reason having taken place. Under these circumstances time may work wonders when the functional activity of the gland is stimulated by the child being put to the nipple, and by the application of hot fomentations to the gland.

When the secretion of the gland is evidently scanty, the child should be weaned at once, for its own as well as its mother's sake.

Galactorrhœa, or the constant flowing away of milk secretion from one or both breasts, either during suckling or after weaning, is a troublesome affection. In some cases the flow is doubtless excessive, in others such a term is hardly applicable, since the discharge of a pint or a pint and a half of milk a day may be the quantity lost, and such is probably no more than the normal quantity of secretion in an active breast. On the other hand, cases have been reported in which the flow was enough, as Dr. Matthews Duncan states, to run through the bed and over it to the extent of many pints a day.[9] It may occur in healthy rich-blooded young women from oversecretion, the unused organ overflowing, as it were, while the

other is being suckled, the milk secretion being of a good character; or, it may occur in feeble women in whom the milk secretion is over-thin, such patients being bad nurses.

It may affect both or only one breast, the rule being that both glands are involved. That galactorrhœa should at times be unilateral, is no more curious than that after pregnancy milk secretion should be unilateral. The cause of the trouble is difficult to fathom; indeed, no satisfactory cause has been assigned. It is probably due to some deficiency in the inhibitory force of the nerve supply. That it has a close connection with the uterine condition there is little doubt, since it as a rule soon ceases when the catamenial functions become re-established.

Treatment.—The chief object of the surgeon in the treatment of these cases is to bring about the re-establishment of the catamenia, and improve the general health of the patient. The administration of iron in full doses is therefore indicated even to affect the uterus, and hot footbaths to act as derivatives should also be employed. Arsenic, quinine, iron, strychnine, and belladonna have all had their advocates, but in no one of these drugs can any great confidence be placed: still, all are good in individual cases. Saline aperients are doubtless valuable, and also some restriction in the amount of liquid food. Belladonna applied locally, with the pressure of a bandage or strapping, is undoubtedly of use; and pressure alone has its value. Opium given in half-grain doses two or three times a day combined with quinine or iron, acts occasionally like a charm. Birkett advises the use of iodine with or without iron as medicine. Iodine has been advocated for years, but I have failed to witness its benefits.

CHAPTER VII.

SCROFULOUS SWELLING (INFLAMMATION) OF THE BREAST.

I HAVE adopted as a heading to this chapter a term applied by Sir A. Cooper more than forty years ago to a class of breast cases which be believed originated "in a low form of inflammation to which the term scrofulous may be applied," and which in more recent times is believed to have its origin in the deposition of tubercle. For many years this affection has not been recognized as a special one, and it has doubtless been mixed up with chronic inflammation and chronic abscesses. How far a distinction should be made between these affections, time and experience will determine: but I think it well to make the subject a distinct one in such a clinical work as the present professes to be.

Sir A. Cooper drew attention to it in the following words: "In young women," he wrote,[10] "who have enlargement of the cervical absorbent glands, I have sometimes, though rarely, seen tumors of a scrofulous nature form in their bosoms, confined, in most cases, to a single tumor in one breast; but in one case two existed in one breast, and one in the other. They are entirely unattended with pain, are distinctly circumscribed, are very smooth on their surfaces, and scarcely tender on pressure. They are very indolent, and vary with the state of the constitution, diminishing as it improves, and increasing as the general health is deteriorating. They produce no dangerous effects, and do not degenerate into malignancy. They do not require an operation; and indeed, is would not be justifiable to remove them by the knife. But I have seen them removed, from an error in judgment respecting their nature, and when cut into, after their extirpation, they are found to be composed of a loose and curdy fibrin, very unequally organized."

Velpeau, in his work on the Breast (1853), as translated by Henry (p. 110), writes, "Though possibly here, as in every other situation, tuberculous abscesses of the breast are, notwithstanding, rare;" "the breast is sometimes the seat of abscesses which may be called tuberculous, because of the progress, and especially of the character of the pus which they contain." He then quotes an example in a woman, aged 40, which he believed to be tuberculous, but which would probably by most surgeons have passed as one of an ordinary chronic kind. Later on (p. 223), he states that "tuberculous tumors, without general tuberculosis, may chance to occur in the breast. They are usually single, and have no fixed sign or form. Lumpy and irregular in shape, they may present themselves in the centre of the gland, first, as under the skin, but more commonly they become developed beneath the mamma. Supervening in consequence of a blow, or without evident cause, they sometimes progress very slowly and indolently, and at others, more rapidly, and accompanied by sub-inflammatory symptoms. They are composed of hypertrophied, lardaceous, grayish tissue, of a sort of cyst, which is very thick in some points, and very thin in others; the loculi of which contain either grayish flocculent pus or free albuminous clots, or caseous or thick tuberculous matter, adherent to or combined with the neighboring tissues; sometimes, however, they are represented by homogeneous masses, which are solid though friable, and which by their form simulate pretty closely encephaloid or colloid masses."

Velpeau then quotes a couple of cases, one in a woman, aged 30, and another in a girl, aged 19, in whom indolent, lumpy, movable tumors, situated in a lobule of the gland, appeared; one was excised, and found to be of the nature described; the second was treated by incision and was cured. In the former, lung disease co-existed, and after the removal of one breast, tumors like those in the excised gland appeared in the other. Velpeau also pointed out that this breast affection is frequently associated with some deep-seated thoracic disease; under such circumstances, the breast trouble is a consecutive one, and needs no discussion. When it appears as a local affection, these tumors are slow in their progress, and rarely attain any size larger than a walnut. They make their appearance as often as not without any known cause,

but occasionally after injury; they are frequently multiple. They occur in delicate lax young women under 35, who suffer from catamenial irregularity, and are at times the seat of pain of a lancinating character: usually this is very slight, and the pain is intermittent.

Dr. Léger writes on the same subject, and reports [11] a case of a pale, anæmic, single lady, aged 30, who, seven months before consultation, discovered an indurated lump the size of a filbert at the lower part of her right breast. This nodule steadily increased in size, and when seen was knotted, subdivided into lumps, and at the same time painful. The skin over the lump was slightly adherent and of a violet color. The nipple was somewhat retracted; axillary glands free from enlargement. The lady had chest symptoms and night sweats, and she died from phthisis.

Billroth reports a case which he described as one of chronic caseous matter, producing mastitis, in a scrofulous girl, who was brought to him with nodules containing caseous matter, varying in size from a hazel to a walnut, in her breast. Each one was incised, and then cauterized with nitrate of silver with a good result.

Richet describes [12] a case, in which, at the outer part of a breast, a tumor the size of a turkey's egg existed, made up of three parts, which was elastic, and hard; pus flowed from two incisions which had been made into it. When pressure was made upon the tumor, pus no longer flowed, but there exuded a sort of plastic lymph, yellowish, stringy, not resembling the fœtid discharge of cancerous tumors, but recalling rather the appearance of thickened lymph. Richet adds, that tuberculous or caseous tumors of the breast, alone, have the characteristics as above described. Other cases of this affection are on record, and I am sure I have seen some, but have failed to recognize them at the time as I ought. My attention was drawn to the subject by an able paper published in Gaillard's "Medical Journal of New York," June, 1884, and written by Dr. G. Durant of New York, who after a careful review of the whole subject, sums up as follows:

From a clinical point of view, tubercles of the breast present two varieties, perfectly distinct from each other: (1) a disseminated form; and (2) a confluent form. In either, the onset is insidious; the tubercular matter is developed slowly,

and without producing pain, and some time elapses, usually, before the patient becomes aware of any trouble in the breast. Sometimes, but very rarely, even at this period, one or more enlarged lymphatic glands, under the inferior border of the pectoralis major, may be found. They vary in size from that of an almond to that of a hen's egg; they suppurate, and a fistula remains, from which a serous pus, containing caseous clots, exudes. These openings, after existing for several months, may seemingly heal, but with the progress of the disease in the substance of the gland they reopen and again discharge.

In the *disseminated form* either there is no increase in the volume of the breast, or it is so slight as not to attract attention. The skin is not adherent to the anterior surface of the breast, the nipple retains its usual pouting form, and the mamma moves readily on the underlying tissues. Careful palpation detects hard masses in the substance of the gland. These are disconnected, variable in number, and the size seemingly inversely as their number. Usually they have the size of an almond, but may attain to that of a walnut. They have but little mobility, seeming to be connected with the adjacent tissues. Their surface is roughened by granulations, their consistence is firm, though not cartilaginous. Seldom do they give rise to pain. They develop very slowly, and often after they reach a certain size the growth ceases. In one case no increase in volume could be perceived, though four years had elapsed between the examinations. The termination of this form is unknown. Dubar[13] says that he is unable, from his researches, to say whether they may disappear spontaneously in whole or in part; or whether, a subacute abscess being formed, they may thus be eliminated.

The Confluent Form.—While the disseminated form may remain latent during the lifetime of the patient, and only be recognized at the autopsy, this is not true of the other variety. The tubercles by their agglomeration and fusion constitute tumors, which, on account of their increasing volume, cannot long remain hidden. The breast may in a few days double in volume from a sprouting out of one or more of these nodules. All these changes may take place without inflammation and without pain; while in other cases, febrile symptoms, gastric disturbances, and severe pain, press hard upon a sick one.

The pain may be continuous and lancinating, or it may continue several days, then disappear, then return anew. Palpation tells us that the growth is not equally distributed throughout the organ. It is confined to one portion of the gland, and here an ovoid body of uneven surface and variable size may be circumscribed. Almost unmovable in the substance of the gland itself, with which it seems connected, the tumor does not appear to send prolongations backward. It is unyielding to the touch, and yet, by fixing the mamma by one hand, a sensation of fluctuation may be perceived. In that portion of a gland where the new growth is not so well developed, only a diffused swelling exists. The lobulation of the gland can with difficulty be recognized; the skin is normal, is readily moved over the anterior surface of the organ, which itself is not abnormally adherent to the deeper parts. Should a puncture or incision be made into one of the fluctuating points, a varying quantity of a purulent liquid, containing caseous clots, will escape, and the volume of the breast will diminish. After a varying time (a month and a half in one case) the fistulous openings close and a slight puffiness alone remains. Sooner or later, however, the swelling reappears, and a new incision is made, or an opening appears, which remains permanently. When the fistulæ are well established, the disease has reached its full development, and the appearance of the gland is characteristic. In that part of the breast greatest in size a well-defined tumor exists, and on a level with it one or more fistulous openings. At the anterior wall of the axilla, fistulæ with fungous ridges are found in the centres of circumscribed tumefactions. The skin around these openings is a dusky red, and for a slight distance is adherent to the subjacent parts. The nipple may be retracted should the fistulous opening be in its neighborhood. Behind the fistula, palpation reveals more or less extensive induration. At the axilla the fistulæ are not deep, while in the mamma the probe may penetrate from one to two inches. The exploration is not painful, nor does noticeable bleeding follow. The tissue exposed through the opening is found to be very soft and friable. One would suppose that this ever-extending, though slow growth, would sooner or later destroy the whole organ. It is not impossible, however, that a portion of the breast may be spared. The termination of tuberculosis of the

mamma by natural process is unknown. Probably a deposit in some other organ, as the lung, terminates the scene.

Dr. Durant draws the following conclusions:

(1) That the breasts may be the seat of tumors similar to the pathological products found in many other organs, to which the name of tubercle is given. (2) Tubercle in the mammary gland is much more common than is generally supposed. (3) That mistakes as to the true nature of these growths have often been made, and ablation of the breast, from a belief in their cancerous nature, has often resulted. (4) That during life we may by clinical observation distinguish them from other tumors. (5) That as no absolute necessity for the ablation of these tumors exists, we should refrain from operating, unless unequivocal signs of malignancy develop.

With all these conclusions, except the last, I am disposed to agree, but would suggest that in the well-marked examples of this affection it would be well to remove the gland, as by Dr. Durant's showing "the termination of tuberculosis of the mamma without intervention is unknown," and all pathologists are now convinced that persistent suppuration in any tubercular disease is prone to prove a centre for general infection, and that as a consequence the sooner it is removed the better.

CHAPTER VIII.

SYPHILITIC MASTITIS.

THIS affection is one which should be recognized, although it is far from common. I have seen but few examples of it. Why it should be so rare may be difficult to explain; it is probable that such cases have been mistaken for and treated as examples of cancer. Neither John Hunter, Sir A. Cooper, Brodie, Birkett, nor Gross, mention the affection. Lancereaux, in his treatise on Syphilis, tells us that the celebrated Sauvages[14] gave an excellent example of it. The case occurred in an unmarried woman, aged 30, who had been using, for several months, the extract of hyoscyamus. She presented, in each breast, a tumor the size of a hen's egg. Dense and knobby, this tumor caused lancinating pains, which extended at times as far as the axillary region, along a chain of glands equally hard and knobby. The patient had ulcers in the mouth and vagina, resulting from syphilis acquired ten years before. Keyser's pills, continued for a month, caused the disappearance of the painful tumors, and other syphilitic manifestations, which did not return.

Richet[15] says, "This tumor presents itself at first with all the characters of a scirrhous tumor, and I confess that in a case observed at the Lourcine Hospital, extirpation was on the point of being performed when the discovery of another tumor, if not similar, at least analogous, in the calf of the leg, induced us to wait. The simultaneous disappearance of these two tumors under an appropriate treatment completely removed all doubt."

Ambrosoli[16] relates three cases, one in a male, two in young women, aged 19 and 24 respectively. Both of the latter presented, soon after the disappearance of syphilitic exanthema, a diffused, firm, somewhat painful swelling of the breast, without change of color of the skin. This swelling being associated

with induration of the axillary glands, iodide of potassium, in large doses, effected the removal of these symptoms without leaving any trace of their existence. "I have," said Lancereaux, in quoting this case, "seen a very similar one."

Velpeau, in his work on "Diseases of the Breast," as translated by Henry, 1853, mentions four cases, as observed by Maisonneuve, and one by Richet. One was a simple gummy tumor. In three others there was at the same time ulceration of the skin over the tumor, and circumscribed congestion of the mammary gland. In all, there existed at the same time other syphilitic manifestations, such as gummatous tumors on the head, ulcers on the legs. The cure in all was rapidly brought about by preparations of iodine.

Studied in both sexes, syphilitic lesions of the breast differ in no way from those of other organs; they are most analogous to those of the testicle. They are essentially gummatous infiltrations of the connective tissue, covering the breast, behind it, or in one or more of its lobules. In exceptional cases the whole gland may be involved.

The disease, where it attacks the subcutaneous tissue over the gland, will show itself as an ordinary gumma, and run its course in the same way. When it affects a lobe or more of the breast, its clinical symptoms are obscure. It may appear as a more or less defined tumor in one lobe, of which it seems to form a part, and the skin over the tumor will in this stage of the affection be natural. As the lump increases, the same want of other symptoms will be experienced, and the tumor may yet feel hard, and be painless. The skin over it may yet be free. The axillary glands may, however, be enlarged. Should the swelling form in the periphery of the gland, the nipple will be natural; should it do so near the centre of the gland, there may be retraction of the nipple.

As the disease progresses, the tumor will enlarge, and the skin over it will become involved, but as in a chronic inflammation, and not as in a scirrhus; it will become glued first to the parts beneath, then become of a dusky color, later on, red, and last of all ulcerated; not first dimpled, then puckered, and subsequently infiltrated as in cancer. The tumor also, as these superficial changes appear, will become more fleshy, softer, and at last give rise to the feeling of fluctuation.

In this, its last stage, the disease has either partially or

wholly softened down, and may discharge itself as an abscess, or the whole tumor may die as a mass, and slough out as may a bursa, thickened and inflamed by gummatous inflammation.

The progressive softening of a gumma in whatever gland or tissue it may be found, is a characteristic symptom of the affection; for diagnostic purposes it consequently requires emphasis.

This disease, although slow in its progress at first, is more rapid toward its close. It mostly attacks women under thirty, although it may appear in a syphilitic at any time. Bumstead states that it may occur as a result of hereditary syphilis, and I am disposed to agree with him, since I have seen an example of disease of the testicles from this cause, and the two diseases are analogous. It can hardly be mistaken for cancer in its later stages. In its early stages the error may take place. The age of the patient in which it occurs, the presence of other manifestations of syphilis, the clinical history of the case, and above all, the suspicion that the disease may be gummatous, will be the best help in diagnosis.

Case I.—Gummatous infiltration of breast; sloughing of the whole gland:

Martha C., a married woman, aged 46, who has had no children or miscarriage, came to me on August 12th, 1869, with an infiltration of the upper lobe of her left breast, which had been coming for eight or ten months. The skin over the swelling was natural. She had with this, enlargement of the axillary glands, and a suppurating node over her left frontal bone, which had been coming for six months. There was no pain in the tumor. Tonics, with iodide of potassium, in increasing and full doses, were given with benefit.

On October 25th, 1869, the breast tumor had become bossy, and presented the external features of inflammation, such as heat and redness, with fluctuation. On March 31st the breast had greatly enlarged, and was as large as a cocoanut. The skin over it was ulcerating, and the gland tissue through the opening looked dead, and presented the yellow wash-leather aspect, so characteristic of syphilitic deposit. In September, 1870, the whole mass sloughed out and fell as a putrid mass into a basin, leaving a clean granulating surface. On November 10th the woman was well.

No history of syphilis could be obtained, but the case was doubtless a true gummatous infiltration of the breast, as supported by the presence of the suppurating frontal node.

The prognosis in this affection is favorable so far as the life of the patient is concerned, and probably so as far as the gland itself is considered, should the diagnosis of its true nature be made out in its early stage. A gumma of the breast ought to be as amenable to treatment by the iodides of sodium, potassium, or ammonium, as a gumma of any other part. These drugs should be given in steadily increasing doses, up to a drachm or more a day. In exceptional cases the removal of the breast by operation may be justifiable. I have, however, never been called upon to perform such an operation.

Constitutional treatment in by far the majority of cases may be expected to bring about a cure.

CHAPTER IX.

TUMORS OF THE BREAST.

TUMORS of the breast may rationally be accounted for by following out the functional aberrations of the organ, and in proof of this we may all with advantage study carefully the highly suggestive and valuable work of Dr. Charles Creighton, on the "Physiology and Pathology of the Breast" (1878), who has shown that "the investigation of breast tumors reveals merely the working of the physiological law of healthy mammary activity under altered circumstances; that various degrees of disordered function may result in various kinds of tumors;" and that tumor disease of the breast is "essentially a disorder of function."

The breast, in passing from its "resting" or inactive state to that of full activity, undergoes during the entire period of pregnancy a process of "evolution" which is characterized in its different stages by certain cell changes within its acini, and transport of cells without; and, in the return of the gland to its quiescent condition on the subsidence of lactation, a process of "involution" in which a parallel series of changes acting in an inverse order is to be observed, the functional subsidence of the gland being spread over a shorter period of time than its gradual awakening during pregnancy.

When the functional stimulus of the mamma is acting at its lowest point at the beginning of "evolution" or the ending of "involution," the secretory products are large granular yellow pigmented cells, which are found within the secreting acini, in the connective-tissue spaces outside the secreting structure, and likewise in the lymph sinuses of the subjacent lymphatic glands, these cells being the waste products of a feeble degree of secretory activity; and, if the mammary excitation were always to act at that degree of intensity, the secretion, it may be said, would always be in the form of large granular pigmented cells.

At the next appreciable advance in the intensity of the stimulus, the product formed in the gland may be described somewhat generally as a large granular nuclear cell, which is nothing else than the crude epithelium of the middle period of the breast's unfolding, in which an imperfect secretory force resides.

Coming still nearer to the full excitation, the cellular ingredients are fewer and the mucous production much more abundant; and finally, when the stimulus is at its height, the mucous fluid has given place to a fatty fluid, and whatever cellular elements the secretion contains are the well-known colostrum cells which approach most nearly the perfect secreting cell.

The periodical unfolding of the breasts, which is an obvious accompaniment of each pregnancy, is thus characterized by a progressive series of immature secretory products which necessarily run to waste. The epithelial cells are not transformed into milk till the time of delivery and during the period of suckling following; but the functional action of the breast has been at work all through the pregnancy, and has advanced in intensity just as the secreting structure has advanced in its unfolding. The various stages of unfolding have corresponding secretory products, becoming less and less crude, and as there is a similar series of more rapid but exactly parallel waste products in the upfolding, it is a legitimate inference to ascribe "a special kind of secretory product to a certain degree of intensity of the glandular force."

When the breast gland is disturbed from its resting state by a cause other than pregnancy, and in consequence of some morbid excitation is urged into a kind of evolution process, the steps of its unfolding are less orderly than in the normal evolution, and the "spurious excitation" never carries the gland to the end of its unfolding, or to the perfect degree of its function. And although the morbid excitation may be said to correspond in this intensity to a stage of the normal evolution, there is this fundamental difference, that the corresponding stage of the normal process is transient, giving place to a stronger force, while the morbid process continues indefinitely at the same enfeebled level. As a consequence, the cell that should have been thrown off from the acinus as waste almost as soon as it was formed, remains in the place

of its origin to multiply, and, with its progeny, to infest the glandular structure of the breast either as intra- or extra-acinous accumulations. Indeed, according to Dr. Creighton, it is upon deviations from the physiological track such as these that the existence of a tumor depends.

Thus, "a circumscribed tumor arises at a particular part of the gland where the spurious excitation has advanced to a certain stage of evolution or unfolding; in that particular region, probably a territory defined by the blood-vessels, the functional force has acted at a uniform imperfect level for a length of time, the inevitable cellular waste of the crude secretion has accumulated within the acini or around them, and the foundation of a tumor has been laid.

In the healthy action of the organ there is a provision for the disposal of the very considerable amount of cellular waste material by means of the neighboring lymphatic glands. In passing from the secreting acini and in traversing the stroma of the gland, the waste cells often acquire a spindle form; and although these cells are not always distinguishable from the connective-tissue cells of the part, there is, especially in the bitch, a class of pigmented epithelial cells in which such changes of form and position can be clearly traced. The spindle-shaped waste products are the type of the peri-acinous cell collections in cystic or adeno-sarcoma.

So far as relates to the large nuclear cells, the intra-acinous collections of them correspond to the structure of medullary cancer, and the extra-acinous infiltrations of the same cells are a distinguishing feature of scirrhus. "The distinguishing feature of the less malignant form of tumor is that the spurious functional activity comes nearer in the degree of its intensity to that of the perfect secretory force, the transformation of the epithelium is a more real transformation, and the cellular waste is reduced, in part at least, to the class of fibre-like or crescentic elements that characterize the myxomatous and more benign issues of the tumor process."

"The circumstance that the unknown diseased excitation most commonly befalls the gland when it is in the state of rest is of the first importance in accounting for the formation of a tumor. Whether the disturbance be a mechanical injury, or a sympathy with excitement in the ovaries, or of a more

general emotional nature, it comes upon the breast in its resting state. The breast can react in no other way than by following the somewhat slow process of its normal evolution; without the intermediate stages of unfolding it cannot reach the perfect degree of its functions in which there would be immunity from danger. The intermediate stages are necessarily associated with the formation of crude cellular products; it is at one or other of the intermediate stages that the morbid force delays, and the corresponding cellular secretion of the gland thereupon assumes the character of a formative or tumor process."

"The circumstances of the functional disturbance are never exactly the same in any two cases, consequently the respective modifications of structure, or in other words, the structure of the respective tumors, is never exactly the same."

"It is the climacteric effacement of the breast that gives a peculiar character to the disease in women, and there are well-marked structural differences in the tumors according as they appear before or after that period. Those that develop after the climateric years are perhaps the most common, as they are certainly the most intractable, and they have been the real source of ambiguity in the pathology of the organ. That ambiguity depends upon the circumstance that they occur in an organ which is gradually losing or has lost its characteristic structure." Where the normal itself is vanishing, the departures from the normal are elusive.

It seems probable, therefore, from Dr. Creighton's investigation, that the fibromata, adenomata, sarcomata, myomata, and carcinomata of the breast have their type in a series of progressive changes which the gland undergoes in its physiological evolution. The feebler the intensity of the function, the more cancerous the disease; the higher or more advanced the evolution from the resting state, the more benign the tumor.

Under these circumstances, there is difficulty in making any definite classification of breast tumors; indeed, if we take the pathological anatomy of diseases of the breast, it is practically impossible to adopt any classification that is precise, which does not involve the writer of a systematic monograph on the subject in much repetition.

The breast, it must be remembered, is composed of a skele-

ton of connective tissue and furniture of gland cells, and there is no single class of breast tumors which may not for any individual case (scirrhous carcinoma excepted) show the free participation of both these elements. As one or the other predominates in any individual tumor, so will it be called sarcoma or adenoma, according to the prevailing opinion of the day, although practically all the cases are essentially of the same complex structure. Furthermore, any tumor in a tubular gland must almost of necessity be liable to the formation of cysts; its very structure presupposes it. Thus all tumors of the breast more or less are associated with cysts; some largely so. Neither the presence of a cyst in a breast tumor, nor of many cysts, has, however, much pathological meaning, although in a clinical sense it so happens that in a certain group of breast tumors which are largely and chiefly cystic, the term cysto-sarcoma has been applied. For the great majority of breast tumors it is therefore true that in any one of them there may be, at the same time, connective tissue, gland acini, and the derivative of gland tissue, viz., cysts.

Some, and these chiefly foreign observers, have classed most tumors which are not carcinomatous with the sarcomata, on the ground that histological investigation shows that the connective tissue is the initially aggressive element, but it is probably a sounder and at any rate it is a more universally applicable view to regard the type of breast tumor as a composite one, and therefore it seems expedient to retain the old term adenoma for many of them, since to call all these tumors sarcomata is to place them in a group which prevents one from saying positively that any individual case is free from the risk of recurrence, when clinical experience teaches us in no uncertain way that the solid adeno-sarcomata of young women are for the most part free from any such risk and that a large number of the cystic tumors are equally benign. On the other hand, there is not one of them, be it myxoma, fibroma, or sarcoma, which may not return should it develop under the faulty inhibition of later life. I cannot, therefore, agree, as I should wish to do, with the view of that excellent surgeon, Dr. S. W. Gross, of America, as expressed in his recent work upon the Breast (1880), and draw a fast and clear line between these varieties of tumors; indeed, I would rather, after the fullest consideration of the subject, still prefer to maintain the

word adenoma as indicating the special gland elements in most of the varieties of neoplasm of the breast, adding the word fibroma to the more fibrous form; the compound word, "adeno-fibroma," clearly expressing the pathology of the class of tumors as well as its clinical peculiarities. The word will therefore be thus used in this work. On this matter I will, however, let Gross speak for himself:

"While it is true," he writes, "that hyperplasia of the glandular tissue of the breast may be so excessive as to constitute the tumor known as adenoma, this occurrence is so rare that true adenomata must be ranked among the most infrequent of neoplasms." "In all of the connective-tissue tumors, the lacteal glands, although their epithelium may be in a state of irritation, generally remain passive, and as the growth advances they may disappear to such an extent as to be scarcely, if at all, recognizable. Instead, therefore, of being newly formed and predominant, the secreting elements are really merely accessory or accidental, and represent the remains of old or pre-existing glands, contained, but widely separated, in a fibromatous, sarcomatous, or myxomatous stroma" (p. 304).

I should like, moreover, to add that the diagnosis between any of the varieties of breast tumors not carcinomatous is uncertain and difficult, and whether a tumor is to be called a fibroma, adeno-fibroma, adenoma, or adeno-sarcoma, can only in the majority of cases be determined by a histological examination of the growth after removal. Clinically I would therefore still divide breast tumors into two great classes, the carcinomatous and the non-carcinomatous, dividing the latter large class into the adeno-fibromata, adeno-sarcomata, and cysto-sarcomata.

Under these headings the different tumors will therefore be considered. I shall treat of the carcinomata by themselves, and likewise all the cystic tumors, with or without intracystic growths; the lipomata, chondromata, and colloid tumors receiving their share of attention.

CHAPTER X.

ADENOMATA AND ADENO-FIBROMATA· THE FIBROMATA OF GLANDS (A SARCOMATOUS ENCAPSULED GROWTH).

Under the term adenoma without doubt a large variety of tumors of the breast have been grouped, this word having included "sarcomatous tumors" of every variety; the "chronic mammary tumor" of Sir A. Cooper; the "mammary glandular tumor" of Sir J. Paget; the "tumeur adenoide" of Velpeau; the "corps fibreux" of Lebert, and the "adenocele" of Birkett. At the present day this grouping is not recognized; consequently, to place myself in accord with its teaching, I shall in the present volume describe several groups of tumors of the breast.

The "fibromata" and "adenomata" of the breast may, in a pathological point of view, be kept distinct, yet it is not possible clinically to maintain this distinction: since in bedside work it is beyond the power of the surgeon to diagnose with any certainty the one variety of growth from the other; and it is only by a microscopical examination of any individual tumor after its removal that its true pathological position can be made out.

It is well, therefore, to know that such a definite diagnosis is of no practical importance, and that the treatment of these varieties of tumors is the same. Indeed, in a pathological sense there is no great difference between the glandular and connective-tissue groups, since all are made up of connective fibrous tissue, ducts, acini, and the cæcal terminations of the ducts in varying proportions. The growths, as a whole, form a chain, of which the links at one end are composed of fibrous tumors, in which the fibrous elements predominate; and at the other end of adenoid tumors composed of more or less typical glandular elements, and containing even glandular secretion; while the intermediate links represent tumors of a

mixed fibro-adenoid type. A connective-tissue tumor, which in non-glandular structures would be either a fibroma, sarcoma, or myxoma, when found in a gland, which is normally made up of gland structure and connective tissue, becomes mixed up with the glandular elements in very variable degrees, so that in the breast, where these varieties are best seen, we have adeno-fibroma and adeno-sarcoma.

While the special characteristics of the tumor may be determined by the changes which are found in the connective tissue of the gland, the changes in the glandular elements themselves are not to be ignored or passed by as of no significance, since I hold it is due to the presence of these gland elements, and the changes that take place in them in morbid processes, that the pathology of breast tumors differs from the pathology of tumors of the ordinary connective tissue unconnected with the gland structures.

It must be remembered that a gland is a compound structure composed of connective and fibrous tissue, with the special gland element in the form of cell structure. In the breast this gland structure is tubular, with clusters of cæcal acini lined with epithelium appended to the tubes.

The breast glands, moreover, are subject to periodical excitement, and at times to active secretion. Under these circumstances, though in variable degrees, increased nutriment is sent to them, and with it increased physiological force is supplied. Should this force fail to attain its true physiological outlet and secrete milk, or should it from some outside or inward cause be excited at wrong times, and as a morbid condition, it will probably tend to mischief, and in a clinical point of view this mischief will, as a rule, take the shape of a new growth.

When an unnatural or morbid excitation affects any part of the gland, and as a consequence growth appears, the result may be overgrowth of any one or of all the elements of which the gland is composed; under such circumstances the gland as well as the connective-tissue structures will increase, and give rise to either the adeno-fibroma where the fibrous tissue is in excess, to the adeno-sarcoma where the cell structure predominates.

In the early history of gland life, the force which the part has supplied to it, in common with the other regions of the

body, is registered in growth and development. At a particular period, again, in its existence, partly, no doubt, owing to calls that are made upon it and partly, also, to a tendency long inherited to take on a definite action at a definite time, the gland leaves off growth and takes on the capability of secretion, and thus is provided an outlet for its energy. Supposing now that, in the full tide of this developmental activity and high nutrition, a part of its secreting surface becomes shut off, or injured and excited when its dormant power cannot find equilibrium in secretion, what more likely (if, indeed, it be not just what we should expect) than that it should go back to its prior formative processes, and commence again to grow? Is not this physiologically sound? At any rate, presumptive evidence in its favor is afforded by the fact that these adeno-fibromatous, cystic, solid, and adenomatous tumors are most common in young unmarried women; in other words, in those in whom secretion is in a state of nascent activity. Give this no outlet, and new growth will very possibly result; but, more than this, the new growth is likely to be of such a kind as shall be a fair index of developmental tone, and of an otherwise healthy state, viz., a fair substitution for healthy gland structure. That this is true is demonstrated by the fact that in certain adenomatous tumors of the breast, encapsuled as ordinary fibromata, the new structure may secrete the normal secretion of the breast. The two following cases, taken from Mr. Birkett's experience, demonstrate the fact. They have been published in the Guy's Hospital Reports for 1855.

"Case I.—Adenoma with ducts and secretion:

"E. A. K., a healthy married woman, when 21 years of age, and a few weeks after marriage, in 1850, discovered a small lump in her left breast. It was situated in the axillary region of the organ, and she is quite sure it never entirely dispersed. I saw her for the first time in January, 1852. She gave birth to her first child in January, 1851, which she suckled, and mostly with the affected breast, until October, when the infant died. At the time I saw her she was pregnant with her second child, and the condition of the left breast was as follows: it was very heavy, solid, and I thought I could detect fluctuation. It was about double the size of the right breast, and

the enlargement seemed chiefly in the axillary region of the organ. The external appearance was simply that of inordinate size and fulness, globular, and projecting from the thorax. The nipple was displaced considerably, and although never well developed, took a direction forward, inward toward the middle line of the body, and upward. Scarcely any pain was ever experienced in the part, but only an uncomfortable sensation of weight. Doubtless, the fact of her being in advanced pregnancy gave rise to considerable difficulty in arriving at an accurate diagnostication of the disease, for it was not until after parturition, in April, 1852, that a new growth could be distinctly felt. The second child she suckled some months. A third child was born in December, 1853. This she suckled one month, and then it died. While suckling the second infant, milk abscesses formed consecutively in the left breast, which obliged her during the later months of lactation to suckle with the right gland only. For several months previous to the operation for the removal of the tumor, its nature was very clear. During the later months of suckling, and after weaning, the normal gland being relaxed and flaccid, the firm, solid, new growth could be grasped by the hand, and isolated from the breast. At the same time the skin rolled freely over the tumor, and the lobulated surface of the growth was distinctly traceable beneath it. A very large vein was also seen traversing the surface of the tumor, and during lactation the dimensions of this vein were enormous. It took a course toward the axilla, where it was lost. On the 28th of February, 1854, I removed the tumor by merely dividing the skin over it; the mass being only very loosely connected with the gland, not a lobe of the true breast was cut, but it was left entirely in its normal situation after the tumor which displaced it was detached. The tumor weighed three pounds. Very little hemorrhage followed the incisions; the edges were adjusted by means of plaster, and the wound healed in about a month. The tumor was composed of lobes loosely connected together. Each lobe could be separated into lobules; these again into glandules or acini, which contained the cæcal terminations of the ducts. From these the smaller ducts united to form larger, and they traversed in some places the interlobular spaces. The free end of some of these ducts terminated loosely on the surface of a cyst, which contained a large col-

lection of a soft solid material, resembling thick cream. An analysis of this compound, made by Dr. Odling, afforded the following results:

Fat,	85.31
Water,	11.43
Albuminous matter (casein ?),	1.63
Animal extractive,	.21
Inorganic matter,	.58

"Besides this large collection of cream in a rather thin-walled cyst, there was not far distant from it, of smaller size, another cyst, filled with an almost cretaceous material. The wall of this smaller cyst was firm and rigid, or like a piece of thick parchment.

"Case II.—The only case, except the last described, in which I have found ducts containing milk, was shown to me by Mr. Nathaniel Ward, who removed it from a patient in the London Hospital. The following are the particulars of the case:

"E. D., an unmarried and healthy girl, when 23 years of age, discovered a lump in her left breast, about three and a half years before she showed it to Mr. Ward. The catamenia did not appear until she was nineteen years of age, then they ceased for nearly a year, and when they again reappeared, the general enlargement of the breast commenced. For a few months before the removal of the tumor, a well-defined and lobed mass, connected with the gland, was perceptible. It was situated behind those lobes of the gland which form its sterno-clavicular quarter; but with care the normal gland tissue could be distinctly detected, independently of the tumor. The lobes of the tumor were clearly visible beneath the skin, and a large vein traversed its surface. It was removed in May, 1855, by Mr. Ward, without any of the breast, and that gentleman sent me a section of the new growth. It was one of the firmest, most dense, and closely-packed, small-lobed tumors, which I have examined. It had an extremely irregular external surface, and between the lobes or in the interlobular spaces, which were united together by loose filamentous tissue, were some large veins. These could be traced into furrows between the irregularities on the surface of the tumor. Ducts were also distinctly seen taking a course directly transverse to the large veins, and apparently disposed upon the surface

of the lobes and between them, without any very definite arrangement. Many of these ducts contained secretion exactly resembling cream. The follicular terminations of the ducts were very perfectly developed, and were very minute, although not so small as those of the normal gland tissue. No juice pervaded the mass, but in some places this creamy secretion of the ducts was easily expressed by the cut surface.

"The mammary glands, the nipple, and areola, were in this instance remarkably characteristic of the virgin state. It is, therefore, a most singular fact that a new growth should possess the function of a normal gland, although somewhat imperfectly, especially when those organs, which the new growth closely resembled, had never been stimulated to the performance of their own peculiar function.

"We shall now take a comparative review of these two very interesting cases: Both the patients were very young women, in good health, when the tumors were first observed. One had been married, and was in the early months of pregnancy when she discovered the tumor. The other was an unmarried woman, and a virgin, when the development of the tumor began. In both cases soon after the observation of the tumor, considerable difficulty arose in diagnosticating the disease; in the first case, on account of the general enlargement of the mammary gland coincident with pregnancy; in the second, because the development of the new growth was accompanied with general enlargement of the entire organ. Until this general enlargement of the organ had subsided, the tumor was not perceptible or distinguishable by touch or sight. When, however, in one case, lactation had produced a rather relaxed state of the breast, and, in the other case, the general excitation of the organ had subsided, then, and not till then, the diagnostication of the disease was comparatively easy.

"These remarks are introduced in order to show the very great caution which should be exercised in pronouncing an opinion upon the nature of almost all diseases of the breast during any active or excited condition of the normal mammary gland. Surprise would perhaps scarcely be excited by the existence of the solid and fatty particles of milk, in the case in which the function of lactation had been performed upon three separate occasions while the tumor was growing.

But the other case demonstrates that even a virgin may have a tumor of this nature developed in the breast, and that the new growth may so closely resemble the normal gland, and be so perfectly well developed, as to secrete the fatty and oily particles of common milk.

"In both these cases the tumors were removed without cutting away the smallest piece of the normal mammary gland, a proceeding highly important in a practical point of view; indeed, in all cases of a like kind, the breast itself should be carefully sought for and preserved. This important fact is alluded to by Sir Benjamin Brodie."

At times these breast growths are composed of loosely connected fibre tissue, with but a small admixture of the glandular elements; the growth would then be called fibro-cellular. The best example of this kind that I have seen I now record. The clinical history of these cases, however, and the chances of complete immunity from future trouble after the removal of the primary growth, are the same as in the most benign tumor.

Case I.—Fibro-cellular tumor of breast, weighing, on removal, four pounds thirteen ounces. It had commenced during pregnancy, and had grown rapidly during lactation. It was removed, and a good recovery took place, the woman being well fifteen years subsequently.

Louise H., aged 34, a married woman, the mother of five children, came under my care on March 17th, 1868, with a tumor in her left breast, which had been growing for eight months, and had made its appearance during the sixth month of pregnancy. She had been confined when coming under observation five months, and was suckling with the healthy breast, but not with the affected one, although at times milk ran from the nipple. The tumor, during three months, had grown rapidly. When seen the left breast formed a large tumor, which measured twenty-five inches in circumference, and at its base seven inches. It was quite movable over the pectoral muscle, and the skin over it, though stretched, was not adherent. The nipple was flattened out. The surface of the tumor was somewhat nodulated, and the mass felt solid and elastic, but it did not fluctuate. The temperature of the breast

was higher than the healthy gland. The axillary glands were not enlarged. The tumor was excised, and weighed on removal nearly five pounds.[17] "Under the microscope the tumor was found to be composed of fibro-cellular structure in various stages of development. A certain portion was made up of wavy tissue fully formed. A larger portion was composed of elongated cells, and fibre cells splitting up into bundles of wavy tissue, and in this structure a large number of nuclei were observed. In addition to these elements, simple cell structures were observed in various portions of the tumor. These cells were for the most part closely packed together, so that in a section composed chiefly of wavy tissue and fibre cells, here and there an accumulation of simple spherical cells could be seen."[18]

It seems that on rare occasions these growths may appear in infancy: when so, they are not to be expected to show the complete glandular elements of adult life; on the contrary, they show more of elementary structures, such as the fatty and fibrous, with some tubes. In the following example these points are illustrated, the best glandular elements of the case being the presence of tubes.

Case II.—Lipomatous adeno-fibroma in the breast of a male child ten months old; operation; cure:

Absalom S., aged 10 months, was admitted into Guy's on July 20th, 1874, under the care of my late colleague, Mr. Cooper Forster, with a hard tumor, the size of a walnut, situated above and to the outer side of the left nipple, which moved freely upon the deeper parts, but to which the skin was adherent, but not discolored. The mother had noticed the lump for about four months, and it had grown rapidly. The growth was excised on July 22d, and found to be made up of fat and fibrous tissue, with some imperfectly developed breast tubes. "The tumor showed a number of tubes like breast tubes, and outside them a germinating fibrous stroma, containing oval nuclei" (Goodhart). The child did well.

Macroscopical Appearances of the Adenomata and Adeno-fibromata.—The external physical characters of these growths after removal, as well as the appearances of their surfaces on section, are very variable, and yet in both aspects they possess a strong family likeness.

That is, all are encapsuled, although the capsules may vary much in their density; all are lobulated, some but slightly, others in a very marked bossy way (Plate I., Fig. 1).

All have, on manipulation, a firm and fleshy feel; and they rarely, if ever, are so hard as a scirrhus.

Some of these tumors, although a small minority, are intimately connected with the breast, so that to remove them, a portion of the gland itself will have to be taken away. Others, which form the large majority, are so loosely attached to it, that they may be shelled out, on the division of the capsule which surrounds them. In a few cases the tumor is pedunculated and appears as a kind of outgrowth from the edge or one of the surfaces of the gland.

On section, the cut surface of every variety of these two forms of tumor has a tendency to become convex, and to exude a tenacious mucoid fluid. It has, when fresh, a white, pinkish or red appearance, according to its vascularity, and presents many different forms of lobulation, as well as degrees of density.

In some cases the surface will show either a coarse or fine fibrous structure, and under such circumstances, little or no glandular elements will be found; the tumor belonging to the fibromata: while in others the most striking feature will be that of lobulation. It occasionally happens that these two varieties of tumor are found in the same breast. In examining a series of specimens of this kind, the varieties of forms which the lobules assume is very remarkable. Where the lobules are large, the growth will generally be succulent; when they are small, it will be compact. In the compact form the microscopical structure of the tumor will be that of a fibroma, including in its concentric interlacunar bundles of fibrous tissue the cæcal terminations of the ducts and acini of the gland. In the more succulent forms of growth the tumor will be more or less furrowed and fissured, foliated or dendritic, and ducts in the process of development will be seen mixed with the true glandular elements. In some cases, again, the lobules will be compact, smooth, and apparently homogeneous; while in others, or even in another part of the same tumor, the lobe will be subdivided up, and each small lobule will be apparently, except at its base, free from connective-tissue attachments to the neighboring lobules (Fig. 2). Under these

circumstances, it will present to the eye much the appearance of a coarse papillomatous growth pressed into a capsule, each papilla being composed of the cæcal terminations of gland structure, filled with epithelial cells, and held together by fibrous elements.

Histologically the epithelial elements will be normally arranged (typical) upon their special basement membrane, and although these elements may be found in excess within the acini of the gland structure, they will still possess a kind of regularity in their arrangement.

In carcinoma no such regularity will be observed. The

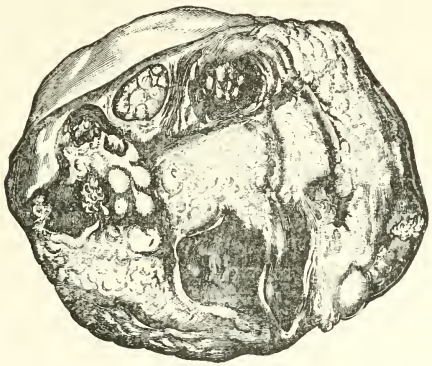


Fig. 2.—Section of an Adenoma, or Adeno-fibroma of the Breast.

epithelial gland elements will not only have no special relation to the cell wall, but they will be found in as great abundance outside as within the cell, and irregularly placed. In fact, they will be found to be infiltrating the whole structure. The presence of the membrana propria in adenoma, and its absence in carcinoma, differentiates the one disease from the other.

In many of these tumors, rounded cavities or irregularly curved spaces are visible, which contain a mucoid fluid, possibly more or less blood-stained. These spaces are sometimes dilated ducts, containing degenerating epithelium, and sometimes apparently spaces due to the distention caused by the degenerate products of the epithelium of the growth. In certain examples of the solid lobulated adeno-fibroma occupying

one of the lobes of the gland, and associated with it, cysts will be found of all sizes, more or less occupying portions of the gland. The cysts may be present without as well as with intracystic growths, and these growths may be of different dimensions and of different structure.

Such growths will, however, to a certainty approach the adenomata in microscopical structure, and show a very variable amount of connective-tissue elements between the lobules, some being dense, others very loosely connected, indeed, probably floating in the serous fluid of the cavity (duct ?) in which it is growing.

The co-existence of these varieties of growths in the same gland, at the same time, raises the question as to the origin of the more solid forms, and suggests the probability that they had originally an intracystic origin, and had filled the cyst. This probability is likewise supported by the clinical fact, that in these cases of solid growth there is occasionally found during their development a serous or sanguineous discharge from the nipple, which can be increased by pressure; and also by the pathological facts that in certain specimens[19] a tube can be introduced into the duct near the nipple, and from it all the cysts composing the mass of cystic and intracystic growths inflated; while in certain cases in which, after removal, fresh growths appear, the first tumor will be of the more solid or fibrous variety; the second in time of age, cystic with loose intracystic growths; and the third like the first,[20] solid: the first and last growths being adeno-fibromata, the second cystic adenoma. The following case of Mr. Birkett's illustrates this point:

Case I.—Of the alternation of the so-called "chronic mammary" tumor, and the "cysto-sarcoma" in the same individual, and at different periods of life.

A healthy, married, but sterile woman, was first seen by me in June, 1851. She was forty-five years old, strong, and in good health, although lately she had felt weak and sinking, and had become rather thinner. The catamenia were not regular, and at times she had suffered with dysmenorrhœa. Four or five months before her application to me she discovered a lump in her right breast; it had been preceded by a pricking and shooting pain, and these sensations had attracted

her attention to the part. When I saw the tumor it measured about one and a half inches square: it was seated on the surface of the gland, and rather toward its sternal border. It was very firm, movable, lobed, and irregular on its surface, and it seemed quite detached from the tissues of the breast itself. The woman suffered great pain upon gentle manipulation, and even for some time afterward. The nipple was unaffected and the axillary lymphatic glands were quite healthy. She said her sister had died of a cancer in the face. Her general health at this time was a little deranged, her appetite bad, and she complained of weakness. Soothing applications were employed over the tumor, and her general health being improved by the exhibition of medicines, the tumor was removed on the 16th December, 1851, by making a single vertical incision through the integument. No part of the breast itself was removed. The new growth was inclosed in a loosely attached envelope; it consisted of three unequally proportioned lobes, and these of lobules which were all associated together by loose connective tissue, in which the cæcal terminations of the ducts loaded with epithelium were inclosed, constituted the lobules.

The wound healed favorably, although the whole gland was extremely tender and swollen, soon after the operation. During the whole year 1852 the breast was usually painful at the catamenial periods, and there appeared to be considerable local excitement in the organ.

In November, 1853, two years after the first operation, a new growth was discovered near the cicatrix; the whole breast was very painful; and in February, 1854, I removed this second growth, together with the cicatrix and a very little adherent gland tissue. The dissection of this new growth exposed several cysts of variable size, and which were filled with intracystic growths, minutely and finely divided into lobules: these were very loosely united together by connective fibre tissue. In another part was a growth much more resembling in appearance the first growth that I removed; it was firm, lobulated, enveloped in a fibrous capsule, and entirely united into a solid mass by connective fibre tissue. As in the first growth, so in these, the minute elements of gland tissue were distinctly visible when magnified; and although the cæcal terminations of the ducts differed from those of the first growth

in many particulars, yet they were well marked and characteristic.

The wound healed favorably, but during the summer months of 1854 she suffered great pain in the axillary half of the organ; the whole became much swollen and indurated, and resembled the breast of a woman during the later months of pregnancy.

In October, 1854, I discovered a third growth at some distance from the cicatrix, and among the axillary lobes of the gland. This increased rapidly, and was accompanied with general swelling and induration of the breast. I removed the third growth in February, 1855. It was much larger than either of the others, was embedded in the lobes of the breast, and was firm, dense, lobulated, and united together by connective fibre tissue. In this growth the cæcal terminations of gland tissue were distinctly seen.

In July, 1855, the patient was well. The principal facts of the case are as follows: The patient when the first growth was discovered, was 45 years old. The first growth was eleven months old when removed; between the removal of the first growth and the discovery of the second, one year and ten months elapsed; the second growth was three months old when removed; between the removal of the second growth and the discovery of the third, eight months elapsed; the third growth was four months old when removed. All the growths, varying as they did in their external appearances, still exhibited, when carefully and minutely examined, those elements and structures which are found in the mammary gland itself, with the exception of ducts. All, therefore, come under the denomination "adenocele."

The first and last were, however, of the same nature as the tumor termed by Sir A. Cooper, "chronic mammary tumor." The second growth belongs to that class of growths described by many writers under the term "cysto-sarcoma."

This case, therefore, clearly demonstrates, that in one and the same individual, at different times, these new growths may alternate with each other. It likewise shows, that the second growth grew more rapidly than the first, and the third more rapidly than either of the other two; and also, that the interval of time between the development of the second and third growth was much shorter than that between the first

and second. These facts, which repeat themselves in the natural history of recurrent new growths, are now generally recognized.

Such cases as these form as it were connecting links between the more solid varieties of fibromata and fibro-adenomata, and the cystic forms of benign breast disease, to which attention will be drawn in the chapter devoted to the subject of "cystic disease with intracystic growths."

When these fibro-adenomata are undergoing degenerating changes, they will appear to the eye of a yellow color, and by pressure or scraping the cut surface cheesy dead epithelial cells may be made prominent. Under other circumstances, when the growth is undergoing a myxomatous degeneration a section of the growth will present a honeycombed surface, and the hollows of the fibrous structure will be filled with a gelatinous mucoid fluid.

Symptoms.—These benign solid tumors of the breast are usually discovered by accident, the patient's attention being rarely drawn to the part by anything that could be called pain; an uneasy sensation in the breast is the most that is experienced. Such a tumor feels, when discovered, as a hard or fleshy, smooth or lobulated nodule, upon, behind, or within the substance of the breast gland; it is generally very movable, and feels like a loose body in the breast, which may at times be separated from it; but should the growth occupy the centre of the gland or one of its lobes, this separation will not be possible. As it grows, it troubles mainly from mechanical causes, for it maintains its original features throughout; it may develop fresh lobules, or become more rounded in its outline, but it will never do more to surrounding structures than stretch them, or press them aside. The mammary gland itself, when these growths are large, may become atrophied, or pressed away up to one or other side of the new growth, according to the lobule of the breast in which the growth originally appeared. When the tumor is central or approaches that position, the breast will be flattened out over its surface. The nipple is rarely much influenced by the growth, and when so it is from mechanical causes. Thus a tumor occupying the centre of a lobe covered with breast structure will stretch the ducts, draw upon the nipple, and thus cause either an obliquity of its position, or some retraction (Fig. 4, page 179). Should

the tumor be a central one, and press equally in all directions, the nipple will become either flat or retracted; I have seen several examples of this affection in which this latter condition was present.

Very little pain attends the growth of these tumors; indeed, in the majority of cases the only sources of bodily discomfort of which patients complain are due to the mechanical effect of the tumor. The chief distress is mental, viz., the fear of what seems so simple becoming eventually a "cancer," or a source of unknown and severe trouble unless submitted to operation. In exceptional cases pain is, however, experienced. Mr. Birkett mentions the fact that in one case intense suffering was due to the filament of a nerve being included in the new growth; and I have certainly found the breasts of some young women who have these growths as sensitive as the simple and uncomplicated irritable mamma.

The integument covering the growth is very rarely implicated, since it is elastic, and yields kindly under a distention which is slow and steady. Should the growth, however, be rapid, the skin may inflame, and even ulcerate, so as to allow the escape of the tumor's contents. With solid growths such as we are now considering, this result is very rare; I have but once known inflammation to occur from distention in such a case. In cystic disease the complication is more common. These tumors never become fixed to the deeper tissues, and only affect them mechanically by pressure, although, as I have said, they may be found to be adherent to adjacent portions of the breast. They do not as a rule give rise to any lymphatic enlargement, and should they do so, it will probably be from some degenerative or necrotic change which is taking place in the growth, or from some irritating effect the growth is producing on the skin or parts around. When lymphatic enlargement co-exists with a tumor which is believed to be benign, the suspicion of its being otherwise should be raised.

Rapidity of Growth.—The more solid the tumor, the slower its growth; the more succulent and loose the structure, the more rapid its increase. When associated with cysts, a tumor may enlarge rapidly, and this enlargement may be the product of increased effusion, or due to the occurrence of bleeding into the cyst. I have recorded a marked example of the latter cause in the twelfth volume of the Pathological

Society's Transactions. On the other hand, these tumors on rare occasions cease to grow or even diminish in size; when it is probable that the diminution in size is due to the absorption of some of the fluid that bathed the free portion of a pedunculated growth.

I have been quite unable to determine the average rate of increase of these tumors; it is so variable. The fibromata and more solid adeno-fibromata rarely attain any size; one the size of a large walnut may be the product of three or four years' growth, and another three inches across represent the growth of fifteen or more years. The more succulent varieties of the adeno-fibromata, although they are usually larger than the more solid, attain a great size in only rare examples. I have removed one of the compact form from a married woman, aged 30, four inches across, that was said to have grown in as many months. In exceptional cases both the solid and succulent varieties may grow rapidly. The cystic forms, as will be shown later on, may, however, increase up to the weight of many pounds. A tumor that grows rapidly with the clinical features of an adeno-fibroma, and is not cystic, is probably sarcomatous.

Multiplicity of and Recurrent Growths.—It is by no means rare for the breast of a woman to hold two or more of these adeno-fibromatous tumors, and both breasts at times may be equally affected. When more than one exists in the same breast, the tumors are as a rule of the same form and density, but I have on more than one occasion removed from a breast a compact tumor, which would be pathologically described as a fibroma, and at the same time a second tumor of a looser and more succulent kind, made up of glandular elements, to which the term adenoma would be applicable: the former example containing but little, and the latter much, of the glandular structure. In the same way, recurrent growths may vary in individual character, though agreeing in kind; a primary growth may thus be of the compact kind, and the recurrent of the succulent; in Prep. 2299[45] of the Guy's Hospital Museum there are three specimens demonstrating this, the third partaking of the characters of the first.

What has been described as recurrence in any given case may be, in truth, simply the continued growth of a tumor which was overlooked during the first operation on account of

its smallness. I have twice seen a second small fibro-adenoma come into view in the incision for the removal of the first growth, which, had it been undiscovered, would have grown, and been called, though wrongly, a recurrent tumor. Tumors that re-appear a few months after the removal of the first growth should be regarded as growths that had been not discovered. (See pages 123, 124.)

These "adeno-fibromata" are found as a rule in the young and unmarried, and in the apparently healthy and robust; they occur, however, occasionally in the aged. The best example of the kind I have seen was in a single lady, aged 71, and it had been of twelve years' growth. When I saw her it was ulcerating. I consequently removed the whole tumor and gland, with an excellent result. The specimen contains samples of every variety of this class of tumors; some masses representing well the fibroma, others the most typical and marked adenoma, both of the compact and loose forms. The adeno-fibromata are seen in every stage. The more compact form of adeno-fibroma, or fibroma, appears generally in girls about the age of puberty, the gland structure at this age having but just advanced sufficiently far so as to be ready under the natural stimulant of conception for a more complete development. In such subjects, when the breast is the seat of a new growth, the adenomatous element is slight, but the fibrous is in excess. In maturer women, and specially in those who have borne children or nursed (when the procreative organs are active, and the mammary glands are in a state of "developmental perfection") the most perfect example of adenomatous tumor is to be expected, since in these subjects the glands have reached their highest physiological function, and consequently their highest development, and any new growths originating in connective tissue at this period would naturally include the active gland structure, and present a more or less succulent and well-marked adenoma or adeno-fibroma, the gland elements being in excess over the fibrous. They are occasionally met with in men in the proportion of 1 to 277 cases of adeno-fibromata in women, as shown by Mr. W. R. Williams, in an able analysis of 11,100 cases of neoplasms admitted into four large metropolitan hospitals, during periods varying from ten to seventeen years, and ending 1883. In women the majority of these cases begin to grow, or are

first discovered, between the ages of 21 and 30, although, as shown by my table, almost as many begin in younger people, at or after puberty; at later periods of life they less frequently originate, although they may be frequently found to exist in them.

From my notes of 100 cases consecutively observed, seen, and analyzed to make out these points:

27 cases were first discovered between puberty and the age of 20, that is, during the developmental stage of the breast's life.
35 cases appeared between 21 and 30 years of age, or during the period of its functional perfection.
22 cases appeared between 31 and 40, during the period of its maturity.
13 cases appeared during 41 and 50; and
3 cases appeared in women over 50, or during the period of its functional decline.
46 of these cases occurred in single women;
39 in the married and prolific;
15 in the married and sterile.

Single women during their prime are consequently most prone to be attacked by these growths, and the married and prolific are the next; the old maid and the married and sterile woman being comparatively free from these benign tumors.

Cause.—No definite cause can usually be ascribed for the appearance of these growths, although in quite exceptional cases injury has been assigned. I cannot say, however, that I have ever been satisfied with any such explanation, for the tumor has usually been discovered too soon after the supposed cause to render the suggestion probable. As a rule, indeed, these tumors are discovered by chance, some accident or blow having drawn the patient's attention to the part, and thus led to the disclosure of the tumor.

Diagnosis.—This should not be a difficult task in the majority of cases. A fleshy or firm movable lobulated tumor in the breast of a healthy-looking single or married woman under thirty; with a mammary gland, its nipple and skin covering, in other respects apparently healthy; and with a history of the slow and probably painless increase of the new growth, or if painful, only so at intervals, or at the times of the cata-

menial flow, is probably an adeno-fibroma. The more movable it is in the gland, the greater the probability of this diagnosis being correct; the more fixed it is, the greater the chance of the tumor being sarcomatous. Any growth that infiltrates the gland, wholly or in part, must be inflammatory or cancerous. The absence of fluctuation in any part of the tumor, and the absence of a marked lobulated or botryoidal outline, excludes polycystic disease; although in every case of growth believed to be benign found in the breast of a woman over thirty, the suspicion of its being cystic should be entertained. The solid or non-cystic fibro-adenomata grow, as already described, in capsules, and simply expand the tissues in which they are placed; they do not spread, as the cancers do, by either local, lymphatic, or vascular infection, but cause trouble simply mechanically by their presence; they do not give rise to discharge from the nipple, as do many of the cystic tumors, and they are generally found in women who are apparently healthy.

Prognosis.—This is, as a rule, favorable, for when one of these tumors has been removed there is every reason to believe that no return will take place. When a second growth appears soon after the removal of the first, there is good reason to believe that it is but the continued growth of a neoplasm which existed undiscovered at the time of the first operation; for I have on two occasions at least, when an adeno-fibroma was being removed from a breast by an incision through the breast gland, which covered the capsule of the neoplasm, seen exposed a small encapsuled second growth, about the size of a pea, which, if left at that time, would have grown, and appeared as a second or return growth. Second or third growths are, however, met with, but such, as a rule, originate in other lobes than that primarily involved, and cannot consequently be called recurrent, for such a term refers to the reappearance of a neoplasm in the position of some antecedent growth, which I do not believe takes place in one out of a hundred cases. Many of these tumors after a time cease to grow, or do so but very slowly; some without doubt diminish in size, and when diminution takes place, the growth is probably cystic, and the absorption of the fluid about the growth has caused its apparent shrinkage. To this point attention will be drawn later on. (See Shrinkage of Tumors,

page 315.) The more fibrous and glandular, or adenoid, the growth is, the better the prognosis. The more embryonic and cellular the connective-tissue elements (that is, the more the growth approaches an adeno-sarcoma and deviates from an adeno-fibroma) the greater the probability of a return.

Treatment.—As a general rule all these tumors should be removed by excision, since experience tells us that they will continue to grow with variable degrees of rapidity; that a tumor which has taken months or years to attain a certain size may often double itself in as many weeks or months, and that no local treatment by applications and no medicines have the slightest influence in retarding their development or helping their disappearance.

It is not, however, necessary to remove every tumor of this kind as soon as it is discovered, for it may grow so slowly, and be so little in the way, as to render its removal a matter of small urgency; at the same time, such a tumor should be taken away from any woman who is likely to become pregnant, or who is past the age of 35, since with a pregnancy the neoplasm is certain to grow, as it, with the gland itself, will have increase of blood sent to it, and likewise from nerve causes will receive an impulse toward growth; and after the age of 35 adeno-fibromatous growths are more likely to pass on to the adeno-sarcomatous, which are far more dangerous.

The operation itself is neither a difficult nor dangerous one. It usually consists of a clean incision through the overlying tissues into the capsule and then the subsequent enucleation of the growth. The tumor should be well pressed forward by the left hand of the surgeon grasping the tissues deeply on each side of the tumor so as to make it prominent and the tissues over it tense; the incision into the capsule of the growth should always be free, and made in a line radiating from the nipple, as by this incision there is less harm done to the breast structure which surrounds the growth, and the risks of injuring the milk ducts are much diminished. When the capsule has been divided, the growth will probably become partly extruded, and its complete extrusion will be facilitated by the division of any fascia which appears to hold it back, and by introducing the handle of the knife between the capsule and the growth so as to lever it out of its bed. The attachments of the neoplasm to its capsule are at times very slight,

and under these circumstances it is readily enucleated; when the attachments are stronger or broader, they may want division with the knife, and under these conditions some vessels may require to be twisted or otherwise secured.

In exceptional cases the neoplasm is so closely connected with the breast tissue as to necessitate the removal of the lobe of the gland in which it is placed.

All bleeding should be thoroughly arrested before the wound is closed, by the torsion of every vessel of any size, and the temporary introduction into the capsule or cavity of the wound of a sponge wrung out of hot iodine water. Its edges should then be carefully adjusted by means of fine sutures and strapping, and the wound dressed, a provision being carefully made for its drainage for twenty-four hours. A little gentle pressure, applied either through iodoform gauze, salicylate wool, or a soft sponge rendered aseptic with iodoform or boracic acid, and bound on with a bandage, is most useful in checking capillary oozing and venous hemorrhage.

In the majority of these cases the wound heals by quick or primary union; where this wished-for result is not secured, the cavity must be daily washed out with iodine water, or some other antiseptic wash, well drained, and carefully dressed with such antiseptic dressings as are favored by the surgeon.

Breasts, after having been subjected to an operation for the removal of one of these benign neoplasms, are rarely so injured as to prevent their performing their physiological functions when occasion calls. In the larger forms of tumor and of operation this result may ensue; but when the neoplasm is of moderate dimensions it is not to be anticipated.

Should the tumor have been allowed to attain a large size, it may be impossible to separate breast gland from growth; under such circumstances it may be necessary and expedient to excise both. It must, however, be stated that large tumors, even up to seven pounds, may be removed from a gland, and the latter left intact and capable of performing its true functions; and under these circumstances it is the surgeon's duty to attempt to save the gland, even when it may appear hopeless. These principles of practice are clearly applicable to cases met with during the child-bearing period of life. At later periods the object for retaining the breast does not exist, consequently the practice based upon it is not necessary.

To render the scar of the operation as invisible as possible, Gaillard Thomas, of New York,[21] when the tumor is of moderate dimensions, makes his incision in the fold which unites the lower hemisphere of the breast to the thorax, and having dissected the gland from its deep attachments, removes the tumor by an incision made in the under surface of the breast. The wound is then carefully drained and treated, and the subsequent scar is very limited.

It occasionally happens that a breast which has been the seat of an adeno-fibroma becomes, in later years, the subject of a cancer. The secondary neoplasm must be regarded as a new growth altogether, and as having only a very slight connection with the first, that connection being probably the same as exists between a cancer and a scar in other parts.

To more fully illustrate many of the practical points mentioned in these pages, the following brief notes of cases, extracted from my note-book, will be read with interest.

The first case refers to the fact that in making a section of breast tissue to enucleate an adeno-fibromatous growth, a second smaller tumor was exposed.

Case I.—Adeno-fibroma of breast; excision; second tumor discovered by the incision made to remove the first; removal of second; recovery:

Harriet P., aged 30, single, a servant, came under my care on September 23d, 1874, for tumor in her left breast. It had appeared nine months previously as a small movable lump, which steadily increased. At present it measures three inches by two, is situated below the nipple, is movable, nodulated, and firm. On the 25th an incision was made over the tumor, in a line radiating from the nipple, into its capsule, and the growth enucleated. When this was done, a second tumor was discovered placed deeply in the gland beneath the one that had been removed. This was then enucleated, and a good recovery followed. A precisely similar case to this came under my care in the person of Sarah V., aged 25, in March, 1882.

The second case illustrates a very important point in the life history of an adeno-fibromatous or other tumor; and that is, the enlargement of lymphatic glands, and their subsequent subsidence after the removal of the primary growth. The case is likewise an example of multiple tumors.

Case II.—Two adeno-fibromata in one breast, with enlarged lymphatic gland; subsidence of latter after removal of tumor:

Sophy S., aged 30, a childless married woman, came to me on May 19th, 1850, with two hard lobulated tumors on the axillary half of the left breast, which had been growing for three years. One was as large as a walnut, the second as a nut. Both moved freely in the breast. There was also an enlarged lymphatic gland in the axilla.

May 28th. The tumors were enucleated through one incision, and were excellent specimens of the adeno-fibromata; the gland elements predominating. The patient made a good recovery after the operation. The enlarged lymphatic gland disappeared. This patient was quite well four years later.

The third case is an example of double tumor in a breast, the tumors being good examples of two of the varieties of adenoma. It shows, moreover, the effects of pregnancy upon the growths, and the value of saving the breast in the operation.

Case III.—Adenoma of breast, associated with adeno-fibroma, complicated with pregnancy; suckling with the affected gland; operation; recovery:

Frances F., aged 22, came under my care March 15th, 1869, with a large tumor in her left breast of two years' standing, and a smaller one of twelve months'. She was then six months pregnant. During the pregnancy the tumors grew fast, as they did during lactation, which she carried on with the affected breast, after a natural labor, for three months, when she weaned the infant. On November 7th one tumor was as large as a cocoanut, and the second the size of a small orange. The latter tumor was much harder than the former. On January 3d, 1870, I removed the tumors and left the breast intact.

The larger tumor, as seen in Fig. 2, page 111, and Plate I., Fig. 3, was a fine specimen of the looser kind of adenoma. The smaller was more of an adeno-fibroma; the fibrous tissue predominating over the glandular. This patient subsequently suckled with the breast, and was in good health five years after the operation. This patient's sister came to me in 1870 with well-marked so-called hypertrophy of her left breast. The gland was twice the size of the right. She was single, and 21 years of age.

The fourth case illustrates the effects of pregnancy and lactation in the growth of an adenoma.

Case IV.—Adenoma of eighteen years' growth, with rapid increase during lactation:

Mrs. H., aged 38, a widow, the mother of one child three years old, came under my care on June 12th, 1867, with a large nodular and fairly elastic tumor, the size of a cocoanut, in her left breast. The breast gland could be separated from the tumor without difficulty, and the nipple was natural. The tumor had been growing for eighteen years, slowly for fifteen, but rapidly after her last pregnancy and lactation. She would not consent to have it removed.

The fifth case is full of interest, since it is an example of adeno-fibroma in a woman, aged 62, and was associated with a retracted nipple, a sign which is too readily accepted as an indication of carcinoma. The new growth also was said to have followed an injury.

The sixth case likewise illustrates one of the same points, since the tumor was associated with a retracted nipple. In it, as in the former cases, the growth was placed in the centre of the breast gland.

Case V.—Adeno-fibroma of the breast in a woman, aged 62, following a blow, associated with retracted nipple:

Dorothy S., aged 62, came under my care on July 23d, 1884, with a hard lobulated tumor occupying the centre of the left breast, associated with a retracted nipple, but no axillary glandular enlargement. The tumor had been growing for eight months, and had followed a blow received upon the part one month previously.

July 30th. The tumor was removed by making a free incision into its capsule, in a line radiating from the nipple. It was encapsuled and turned out with the greatest ease. A good recovery ensued. The tumor was an excellent example of adeno-fibroma.

Case VI.—Adeno-fibroma of the breast, with retracted nipple, in the daughter of a woman who had carcinoma of the breast:

In 1878 I removed from the left breast of Miss N., a healthy girl, aged 18, an adeno-fibroma of six months' growth, which was placed in the centre of the breast, and gave rise to re-

traction of the nipple. The case did well. I had two years previously removed the right breast of her mother, who was then well, for a rapidly growing carcinoma. Her mother's sister had likewise had cancer of the breast.

The seventh case is quoted as a rare example of keloid attacking the scar of an old breast operation, and the still rarer absence of return after the excision of the keloid growth.

Case VII.—Adeno-fibroma of breast; excision; eight years later keloid of scar; excision; no return five years later.

Miss M., aged 34, a healthy lady, consulted me on December 30th, 1870, for a typical adeno-fibroma of her left breast, which had been growing for six months. It was hard, bossy, and movable. It measured four inches across. I removed the growth without injuring the breast, and the case did well. On February 24th, 1879, that is, over eight years after the operation, this patient came to me with a genuine keloid tumor in the scar of the old operation, which had been coming for seven months. Dr. Sidney Turner, of Sydenham, under whose care she was, excised the keloid with a good margin of skin, and on September 25th, 1886, he reported the lady as being well.

This case is doubtless interesting, first from the fact that a keloid growth should attack the scar of an operation eight years after its performance; and second, that on the removal of the keloid there should be no return.

The eighth case is, in every way, an admirable example of adeno-fibroma of the breast. It began early in life, originated during pregnancy, grew rapidly during several puerperal periods, and shrank after lactation to its former dimensions. When it was excised it weighed seven pounds, and in this operation the breast was uninjured, as it was able later on to perform its physiological functions. The clinical history of the case extended over ten years.

Case VIII.—Case of adeno-fibroma of seven pounds weight regarded as one of hypertrophy, and removed; the breast was saved, and secreted freely in later years:

Eliza K., a healthy-looking married woman, aged 24, was admitted into Guy's Hospital, under the care of Dr. Ashwell, on October 15th, 1840, with a large tumor apparently involving the right breast.

She married at the age of nineteen, in due course had a child, and nursed it with both breasts, but had to wean the infant on account of sore nipples. The right breast, as a consequence, became the seat of an abscess, which opened in many directions, and then healed. Within eight months of her first confinement she again became pregnant, and in about the twelfth week she perceived a lump the size of a hen's egg in the axillary border of her right breast; it was neither tender nor painful, but it steadily grew, so that on the third day after a natural labor the tumor measured eighteen inches in circumference. Mrs. K. nursed only with the left breast,

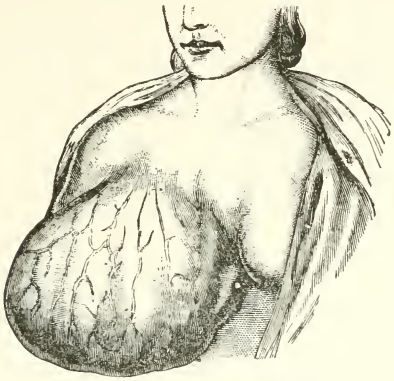


Fig. 3.—Adeno-fibroma of Breast.

and the right began to decrease in size, so that in the eighth month of lactation the growth was not larger than an orange. At this period she became pregnant for the third time, and at the end of the third month, as in the second pregnancy, the tumor began again to enlarge, but more rapidly, though without pain; the tumor then measured twenty-three inches in circumference. At this time she came into the hands of Sir A. Cooper, who punctured the tumor and evacuated two ounces of curded milk, the wound soon healing. She became pregnant again and prematurely confined, and did not suckle, as the child died twenty hours after birth. The tumor, however, on this, as on the former occasions, became smaller, but

not to a great extent; it dwindled down, however, from twenty-three to fourteen inches. A fourth pregnancy then occurred, when, as before, the tumor increased, and soon attained a measurement of twenty-nine inches, and a weight of nearly twenty pounds. At this time she came under the care of Dr. Ashwell. A natural labor soon followed, and four days after parturition, Dr. Oldham, who was watching the case, reported that the circumference of the tumor had increased two inches and a half, so that it measured thirty and half inches. Four weeks after labor the tumor had decreased five inches; she did not suckle with the breast, although she did with the other; on applying pressure to the breast, a little milk exuded from the nipple. The engraving above represents the appearance of the growth, which was lobulated, soft, and elastic. It measured twenty-nine inches round, and weighed nearly twenty pounds. Dr. Ashwell regarded the disease as one of hypertrophy. In 1843 the patient passed into the hands of Mr. Stanley, who removed the tumor on July 16th, 1843, leaving the normal breast, seen in the figure, on the sternal side of the tumor, unmolested. The tumor then weighed only seven pounds.[22] A further note of this interesting case is found in Guy's Hospital Reports,[23] by Mr. Birkett, who writes: "I have seen this patient several times since the operation. She has given birth to three children, and suckled them with the breast from which the tumor was removed. When I last saw her, which was seven years after the operation, she was in good health, and quite free from any disease. I have, through the kindness of Mr. Stanley and with the assistance of the patient herself, identified the tumor in the museum of the college (Prep. 399) with the woman whose history is recorded by Dr. Ashwell, as given above.

CHAPTER XI.

ADENO-SARCOMATA.

The Sarcomata of the Breast Gland: an Encapsuled Growth.—Sarcomatous tumors are new growths that originate in connective-tissue structures, and are composed of embryonic connective-tissue elements. The cells are, as a rule, irregularly arranged in an intercellular substance, through which the blood-vessels permeate.

They are probably formed from the connective-tissue cells, and the cells assume sometimes a spindle, sometimes a round, and but rarely a giant shape; the name of the growth being determined by the marked predominance of any one kind of cell elements.

These growths, in only exceptional instances, infiltrate a part, as do the epithelial or carcinomatous, but are more or less encapsuled, the capsule varying considerably in its density, this density being apparently much determined by the rapidity of the tumor's growth (Plate I., Figs. 5 and 6).

The tumors, moreover, vary much in their consistency; some are firm and approach the fibroma in feel and appearance; in such, the fibrous tissue is abundant, and the cell element comparatively small (Plate I., Fig. 5). The cells, moreover, in these firm growths will probably be of the spindle shape, the cells of the connective-tissue growth having developed into fibres, which form bundles, fasciculate, and contain within their meshes undeveloped spindle cells. These growths form the "spindle-celled" group of sarcoma, which have been described by the older writers as the "fibro-plastic," or recurrent fibroid, and so described because they are prone to recur, after removal, in the part from which they originally grew, or in the neighboring parts.

These spindle-celled sarcomatous growths on section usually present a white, glistening, semi-transparent surface, which

bulges to form a convex outline. They may be homogeneous, or to a degree lobulated, and on scraping the cut surface it will yield the oat-shaped cell, with an oval nucleus.

The soft or more succulent varieties of sarcoma are probably the round-celled kind, which seem to be composed chiefly of cell elements, held together with but little fibre tissue. These are well supplied with blood, and in some cases are so vascular that they pulsate, and become, from slight injury or other cause, the seat of blood extravasation. Such tumors are of rapid growth, and present in section a white medullary or a more or less blood-stained convex surface (Plate I., Fig. 6). In a clinical sense there are, however, great difficulties in correctly diagnosing these forms of tumor.

In some, again, where much blood has been extravasated, the cell elements are difficult to find; indeed, the tumor seems to be but a blood clot. From such tumors of the breast I have known a quart of fluid, coffee-ground, or almost pure blood, drawn off.

Many round-celled sarcomata have spindle cells and fibres mixed with them. Many lie simply imbedded in the tissues, and turn out like loose bodies; such have a very glistening convex surface in section, and seem to a degree translucent. They are at times, though rarely, multiple. All forms of sarcomata, besides recurring locally, tend, as is well known, to disseminate themselves by the blood-vessels. At times even they may spread through the lymphatics; thus local recurrence, vascular and lymphatic infection, conspire to produce the most inveterate form of malignancy.

When any of these connective-tissue tumors originate in the breast, which is composed of gland structure, in addition to connective tissue, some of the glandular elements, either tubes or their cæcal terminations, are mixed up with them.

Under these circumstances, the anatomical structure of the growth becomes modified, and thus it is that the more expressive term "adeno-sarcoma" seems to be applicable. In some cases these glandular elements will form but a very small part of the tumor, and will be detected scattered about its tissue only after a very careful examination, while in other cases they will be met with in abundance, mixed up with the other elements. It is this mixture of gland structure with the sarcomatous elements that specializes the connective-tis-

sue tumors of the breast, and more than justifies the retention of the term "adeno-sarcoma."

It is difficult, if not impossible, in the present state of our knowledge, to say in what proportions of sarcomatous tumors the round-celled, spindle-celled, or giant-celled neoplasms predominate. My own material, although extensive, is not conclusive upon the subject; indeed, I should say, after close examination of notes of cases, that the majority of them are of the mixed form, that is, made up of round and spindle cells in different proportions, the giant-celled variety being rare, and the melanotic very so.

In a large proportion of cases, I should say in half, the adeno-sarcomatous tumors of the breast are associated with cysts, when they are known as cystic sarcomatous tumors. To these, special attention will be directed in Chapter XVI. In the present chapter attention is alone drawn to the more solid varieties.

Gross has attempted to strike an average as to the relative frequency of the different varieties of solid sarcomata, and states that sixty-eight per cent of one hundred and fifty-six cases collected and seen by him, were of the spindle-celled variety, twenty-seven per cent of the round-celled, and five per cent of the giant-celled. By this estimate, two out of three cases are spindle-celled tumors.

From a clinical point of view there is, however, no great necessity for separating the different varieties of tumors, beyond recognizing the general fact that the more elementary the cell structure of which it is composed, and the greater the proportion of cell elements which build it up, the more rapid will be its growth, and the softer its structure; the greater also will be the probability of a speedy return of the tumor after removal, and the stronger the fear that secondary growths will take place in the viscera or other parts. On the other hand, when the cells tend toward spindle shape and are not numerous, when the tumor is generally firm in consistence and slow in its growth it is less likely to return rapidly after removal, as well as to affect other parts. In short, whereas the former or softer type of tumor approaches the carcinomata in its natural course, the latter or firmer type tends to follow the course of the benign or non-infective varieties of tumors.

The sarcomata in the breast differ also in themselves as

much as the sarcomata of connective tissue are known to do; and they may appear either as firm or soft succulent growths, with little or much blood in them, or almost as blood tumors.

The amount of cell elements, as well as the character of the cells, will probably vary in every example. Where the cells are few and connective-tissue fibres abundant, the structure of the growth will be firm; where the reverse holds good, and the cell elements predominate, it will be soft and medullary.

In the matter of vascularity, these embryonic connective-tissue tumors vary materially; some have a perfectly white and creamy appearance, while others possess a pinkish, semi-transparent surface. A few are very vascular, and show on section, scattered through their tissues, innumerable vessels; while in some cases the growth seems to be so full of blood as to appear as a blood cyst, or tumor; such cases as these have suggested to pathologists the probability that the embryonic connective-tissue cells themselves possess the power of forming blood-vessels and blood corpuscles, as a pathological process, in the same way as they are known to do in fœtal life as a physiological process in the embryonic mesoblast; the blood-forming function of the connective tissues of the mesoblast in embryonic life having been re-awakened, after its normal period of activity has long passed, to form a sarcomatous tumor of a sanguineous type. Dr. C. Creighton has cleverly worked out this view.

These sarcomatous neoplasms in their clinical features simulate the more benign "adeno-fibromata."

Like the adeno-fibromata, they are encapsuled, but they are far more intimately connected with the breast than are those growths; they may be said, indeed, to be more closely connected with their capsule to the breast than are the adeno-fibromata, and they can rarely be enucleated from their beds in the same way.

As primary growths they never infiltrate the breast, in the characteristic way of the carcinomata. As secondary or recurrent tumors they do in exceptional instances.

They grow and separate tissues like the adeno-fibromata. They also stretch the integuments covering them in, and even cause their rupture; and when this event has taken place, the neoplasm bursts forth in all its force, and shows itself as a

soft, sprouting, fungating, and bleeding mass, which the old authors called a fungus hæmatodes.

These neoplasms grow rapidly, far more so than the adeno-fibromata or the majority of cancers; a tumor of this kind may attain the size of a cocoanut in three or less months. At times they grow slowly at first, and then suddenly increase at a rapid rate. They also speedily undergo degenerative changes and break down, showing then in section great cavities; at times they even slough. The outline of these tumors is as a rule more uniform than an adeno-fibroma, it is rarely so lobulated; it usually originates as an isolated growth; it is rarely, if ever, multiple. It is never so movable within the gland as is an adeno-fibroma, but seems part and parcel of the lobe of the gland in which it originated. It is usually as movable with the gland as an adeno-fibroma. It is rarely associated with any lymphatic glandular enlargement, although in exceptional cases it may be; this complication is more likely to occur when the skin becomes much distended, and consequently irritated by the growth, than under other circumstances. In some of the worst examples of this disease the lymphatic glands are never involved.

"Sarcoma," writes Gross (p. 22), "however, may extend along the blood-vessels and invade the adjoining tissues without its capsule being necessarily destroyed. Hence, during their further growth and extension, sarcoma, like carcinoma, exhibits malignant attributes, as evinced in the latter by the continuous growth of the cells into the coverings of the mammæ and the subadjacent structures, and by their transportation to associated lymphatic glands and the viscera, where they proliferate and supplant the natural tissues; and in the former by the same phenomena, with the exception of the conversion of the lymphatic glands into secondary growths."

These sarcomatous growths likewise simulate the carcinomatous in their tendency to recur, and, what is more, in their rapid tendency to recur. It often happens that a second tumor will appear before the wound of the operation for the removal of the first has closed; so rapidly, indeed, may this apparent recurrence ensue, that the surgeon is led to think that what is regarded as a recurrence may have been but a continued growth of some part of the neoplasm that had been

left behind, or some tumor which had not been discovered. In many cases he will doubtless be right in his suspicion; but in others all evidence upon the point is deficient, and the reappearance of the growth must be regarded as a recurrent growth. These local recurrences may continue for many times. I have in one case already operated seventeen times in the course of three years, and the disease is yet quite local. (See Case I., Chapter XX., page 308.)

In some cases the disease not only returns locally, but like the carcinomata involves other organs, and particularly the viscera. Gross states "that mammary sarcoma recurs locally in 61.53 per cent of all instances, and that it gives rise to secondary deposits in distant organs in 57.14 per cent;" whilst "in carcinoma 88.35 per cent of the local recurrences are met with in the first year, while only 50 per cent of the cancers affect distant parts."

It is, however, to be remembered that Gross draws his experience from selected cases, in which the proof of the sarcomatous return of the growth was determined by histological examination.

These sarcomatous growths rarely attack the breasts of young women, but rather of those over 30 or 35, and they are not uncommon in women about fifty years of age. They are found also in male subjects; out of 68 examples of sarcomata of the breast consecutively observed in four large London hospitals, according to Dr. W. Williams, two were in men.

Diagnosis.—The diagnosis of an adeno-sarcoma from an adenoma or adeno-fibroma is difficult, and in many cases clinically impossible. Its true nature is to be determined better by its progress and clinical history than by its physical features. A lobulated, slow-growing, firm, fleshy, movable growth in the breast of a young woman is probably a "fibroma," and not a sarcoma; whilst an ovoid, smooth, elastic tumor, of somewhat rapid growth, in the breast of a woman over thirty, is probably a sarcoma. The younger the patient, the more lobulated the neoplasm, and the slower its growth, the greater the probability of the tumor being a fibroma. The older the patient, the smoother the outline of the tumor, the more elastic its feel, and the more rapid its growth, the greater the probability of the neoplasm being a sarcoma. When the integument covering in the tumor, which was solid,

is ulcerated, and the growth appears through the orifice as a sprouting, fungating mass, the disease is probably sarcomatous, although, should the disease have been cystic, this conclusion would not be so clear. As to the relative frequency of adeno-sarcomatous and adeno-fibromatous tumors, out of my last hundred cases of these collective growths but four were pronounced to be sarcomatous.

"A tumor," writes Gross (p. 99), "of soft, elastic, apparently fluctuating consistence, which attains the volume of an adult head in a few months, can scarcely be anything else than a small-celled sarcoma. On the whole, the diagnosis is based upon their indolent origin, lobulated outline, rapid increase, large dimensions for the period of their existence, freedom from lymphatic involvements, and marked tendency to ulcerate; upon the not infrequent discoloration of skin, enlargement of the subcutaneous veins, and possibly, elevation of temperature; upon the suffering which they awaken late in the disease, and upon their greatest frequency after the thirty-fifth year."

Treatment.—These neoplasms cannot be taken away too early; they should be excised as soon as they are discovered. They should not only be excised, but the parts around them should likewise be taken away, that is, the lobe in which the growth originated. The whole gland should only be removed when it seems to be involved in the disease; it is better, however, to err in these cases by taking away too much than too little.

Recurrent growths should likewise be dealt with in the same thorough way. These are at times multiple, and when so, the operation must be extensive. I have removed recurrent growths from one patient seventeen times in three years, and at the last operation, in 1887, the disease was still local. Indeed, there is good reason to believe that by removing the local affection, even after many recurrences, the disease is prevented from becoming a general one, and involving internal organs. In a case of small spindle-celled sarcoma, Gross succeeded, after removing fifty-two tumors by twenty-three distinct operations (the last few of which included portions of the pectoral and intercostal muscles, in a period of four years and a half) in checking the reproductions, and the patient was perfectly well nearly eleven years subsequently. Gay, Birkett, Heath, S. D. Gross, and Haward have likewise

reported cases, showing the advantages of repeated operations in cases of recurrent sarcoma.

In many of these cases, after removal of the tumor, it is wise to leave the wound open, and let it granulate, after having well swabbed its surface with a twenty per cent solution of chloride of zinc. I have thought that this plan of treatment destroyed such cell elements as might have remained after the operation, and in this way retarded, if not prevented, recurrence. When lymphatic glands are enlarged they should be taken away, but the prospects of anything like a cure under these circumstances are very feeble. Indeed, when the lymphatic glands are involved in sarcomatous growths, the prognosis is as bad as possible, and the surgeon should consider carefully as to the expediency of advising any operation. It may safely be said that it can be in only exceptional cases a justifiable measure.

By way of further illustration of the subject, the following cases may be quoted:

Case I.—Adeno-sarcoma of breast; excision of tumor; recurrence of growth; ability to suckle with breast between while; excision with the breast; well two years later, five years after the appearance of growth.

Elizabeth M., aged 36, was admitted into Guy's Hospital under my care on the 14th of July, 1880, and was discharged on the 16th of August, 1880.

The patient is a married woman, and has eight children, seven of whom are living. She was in Lydia ward three years ago under my care, when I removed a tumor from her breast.

Her father and mother are both alive; there is no history of cancer with them; one of the patient's brothers died of tumor of the liver.

The old report of her case describes her as a healthy-looking, well-nourished woman; she entered the hospital 7th June, 1877, and then had a large tumor occupying the left breast, but extending chiefly downward, and outward toward the left axilla. There was a scar to the outer side of the nipple, which was caused by a surgeon making an incision some weeks previous. The circumference of the left breast was 18 inches. On June 19th, 1877, patient was put under chloroform, and Mr. Bryant made a transverse incision eight inches

long, reaching from the outer boundary of the tumor, inward and toward the level of the nipple, so that the growth was removed without extirpation of the breast. A large axillary gland was also removed; the great size of the arteries was very noticeable, one of these being as large as the radial. The growth weighed 2 lb. 4 oz., and was composed of a number of cysts, some containing a milky fluid, and others more solid contents. The patient left the hospital on 18th July, with the wound almost healed, and in a fairly satisfactory condition.

Since leaving the hospital, the patient has had one more child, and she has been able to use the left breast in nursing; the child was weaned about twelve months since; about this time she first noticed a small lump just above the nipple, which has been increasing ever since.

On admission there is a large lobulated tumor, divided into two chief parts, involving the left breast. One of these parts occupies the central or upper half; the other, which is the smaller of the two, is placed on the axillary side of the gland. The tumor is above the level of the old cicatrix. It is freely movable, with a lobulated surface, elastic to the touch; hard in some places and moderately soft in others, and it is cystic in character; the skin over the tumor is not involved. One boss, which is most prominent, and placed just above and to the inner side of the nipple, is inflamed and painful. On July 20th, 1880, the tumor, with the breast, was removed, and a good recovery followed.

The tumor was everywhere encapsuled, and was composed of many lobules, separated from one another by fibrous septa. Some of these lobules grew into the walled cysts, which contained little or no fluid, their walls being in contact. The growths in these cysts were in some cases lobulated finely on the surface, whilst in a few they resembled in color and smoothness a mucous nasal polypus, although in consistence they were a little firmer. The majority of the lobules showed on section a finely lobulated appearance, the outlines of the little lobules being crescented, some having a distinct cavity in the centre. No communication could be traced between the various cysts, nor could any be traced directly to the nipple. Some parts of the growth were firm, hard, and fibrous; there were no blood cysts or any translucent-looking material, in the growth.

In some of the nodules (felt to be elastic during life) there were many elongated slit-like spaces with smooth walls, the bounding material being acinous.

In September, 1882, this woman was still well.

Case II.—Spindle-celled adeno-sarcoma of breast; tumor weighing two pounds on removal; recovery; patient well six years later.

Matilda H., aged 49, the mother of three children, the youngest being 18, came under my care on October 7th, 1874, with a large tumor apparently involving the right breast. The tumor had been growing for two years, and when first discovered was about the size of a nut; it has grown steadily, but for the last two months rapidly. It has never been the seat of much pain; an occasional dart of pain through it is all she has felt.

When seen, a smooth globular swelling occupied the position of the right breast. The skin over it was stretched, and the circulation through it was impeded, as shown by the enlarged veins. The nipple was flattened, and the axillary lymphatic glands were natural. On October 13th the tumor and breast were excised, and a good recovery followed. The tumor was found to have been placed behind the breast, or rather in the posterior part of the breast. It was closely connected with the gland, but not infiltrating it. On section it was made up of fibro-cellular elements, containing within its meshes spindle cells. It weighed two pounds.

Six years later this patient was quite well.

Case III.—Adeno-sarcoma (spindle-celled) of breast; excision; cure; patient well two and a half years later.

Fanny C., a married charwoman, aged 50, the mother of five children, all of whom she suckled, came under my care January 25th, 1878, with a tumor in the upper part of her right breast, which she had accidentally discovered six weeks previously. It was then the size of a pigeon's egg, smooth and painless. When coming under care the tumor had much increased; it was about two and a half inches in diameter, firm and fleshy to the feel, and fixed in the axillary lobe of the right mamma. The skin over the tumor was healthy. Nipple natural, axillary glands not to be felt. An adeno-sarcomatous tumor was diagnosed, and removed, with the breast, on January 29th, and the woman did well. The temperature never

rose above 99° after the operation. Two and a half years subsequently she was known to be well.

The tumor, on examination, was found to be encapsuled, but closely connected with the breast. It was a semitransparent, succulent, very vascular neoplasm, and under the microscope was clearly a spindle-celled sarcoma.

Case IV.—Adeno-sarcoma of breast; excision of the gland and tumor; two years later the opposite breast became involved; this was excised; and two years later still the patient was well.

Mary S., aged 33, a single woman of healthy aspect, came under my care in April, 1877, with a swelling in her left breast, which she had detected as a small lump eight months previously. When seen, a tumor was readily made out to exist in the upper and outer border of her left breast, which was so closely connected with the gland, that both moved together. The nipple with the skin over the tumor was natural, and the lymphatic glands were not enlarged. On May 15th an incision was made into the tumor, and as it was found to be intimately connected with the breast gland, both were removed. The patient did well. The growth was found to be a spindle-celled sarcoma.

In August, 1879, that is, two years after the operation, the patient re-appeared with a growth in the right breast, which had been increasing for one year, and followed the same course as the one in the left. It was placed in the upper part of the gland, and seemed to be part of it: it measured about two inches across. On August 12th the breast and growth were removed, the patient doing well. The tumor was precisely of the same character as the former one. Two years later the patient was well.

Case V.—Round-celled adeno-sarcoma of both breasts; removal of both; patient well two years later.

Mrs. G., aged 24, the mother of one child, consulted me in December, 1868, for a swelling the size of an egg in her right breast, which she had discovered during her only pregnancy, four months previously. She had been suckling, when I saw her, three months. The swelling was fleshy, smooth, and painless, and was clearly growing fast. Weaning the child was advised. By July, 1869, the tumor had increased to nine inches by seven in diameter; the skin over it was healthy;

nipple natural; axillary glands uninvolved. It was then removed, with the breast, by the late Mr. Ashforth, of Rutland, and sent to me for examination. It was a soft, succulent, pinkish, homogeneous growth which, on section, exuded a glutinous fluid. It was made up of round cells, and some adenoid tissues. The patient did well.

Four months later a like growth appeared on the left, or opposite breast, with some enlargement of the axillary glands of the same side. These I removed, with the breast at once.

One year later I saw this lady with an excellent cicatrix, and after the lapse of another year she was reported as well.

Case VI.—Large cystic sarcoma of the left breast; amputation; recurrence; exhaustion; result, death.

Emma S., aged 52, a cook, was admitted into No. 3, Lydia ward, under the care of Mr. Bryant, on December 4th, 1883, and discharged on the 15th February, 1884; she was readmitted on the 2d April, 1884, and died on the 6th May, 1884.

The patient is a single woman; her father and mother died of old age; she has one brother and five sisters, all healthy. Fifteen years ago patient had small-pox, but since has been quite healthy until ten months ago, when she had bronchitis. About this time she noticed a small hard lump, the size of a kernel, in her left breast, just above the nipple; the growth slowly increased; it was not painful; seven months later it had attained about the size of a fist; no aggravation of symptoms took place during the periods of menstruation.

On admission, the patient is a fat, healthy-looking woman; there is a large-sized tumor occupying the position of the left breast, which measures 30 inches round its base, 16½ inches across the nipple from above downward, and 17½ inches from right to left in the same direction (Plate I., Fig. 4). From the measurements it will be noticed that the growth has doubled in size in the last two months. The surface generally of the tumor was congested, with enlarged and engorged subcutaneous veins over the upper two-thirds of its surface; the skin was tense and shiny, and over several areæ the tumor was more prominent and the skin blue, with a mass of dense network of enlarged veins; there were two large bosses above the nipple, which were raised, measuring 3 inches by 3. Areola and nipple were somewhat stretched out; there was no evidence of fluctuation; the surface above the nipple was

tender and painful to the touch, and gave evidence of indistinct fluctuation in several spots; there was no involvement of the axillary glands; the patient complains of a darting pain at times through the tumor; the temperature, just after her admission, was 99°.

On December 7th Mr. Bryant removed the tumor with the breast, and the case ultimately did well; the patient leaving the hospital convalescent.

The patient was re-admitted on April 2d, 1886.

History of the Secondary Growth.—The patient noticed round and over the old wound, before it had entirely healed, some return of the growth; on readmission the swelling had extended all over the left breast, and at an elevated spot, near the axilla, it had broken down. The discharge from the growth was very small at first, but it has since gradually increased, and pain has accompanied it more or less all the while. She has some nerve-pain down the arm to the elbow.

Condition on Re-admission.—The patient looks very healthy, but this has been her general appearance all along. The seat of the former tumor is involved with new growth, but there is no lymphatic glandular enlargement. The tumor extends externally to the anterior fold of the axilla; internally as far as the middle of the sternum; above as high as the upper margin of the first intercostal space; and below it runs downward to the eighth rib. It presents two sloughing surfaces, one about two inches square, over the sternum, at the upper and inner angle; the growth being composed of four nodules which have united and formed one mass, the surface of which is sloughing.

About two inches external to this is another single nodule, which has a sloughing surface; the edges of the two are clean cut and well defined, and over the whole circumference there are various nodules, which are soft and rather painful. The skin appears brawny and of a red color. The whole mass moves freely over the ribs and deep parts. The patient's powers steadily failed under the exhausting effects of the discharge from the broken-down growth; and she died on May 6th. No secondary growths were found.

Melanotic sarcoma of the mammary gland is a very rare affection, and as a primary disease I believe it to be unknown. In the two following cases it was of a secondary character.

Case VII.—Melanotic sarcoma of the breast, skin, and axillary glands, following the removal of a growth originating in a mole.

Lydia M., aged 36, a married woman, the mother of one child, nine years old, came under my care in December, 1857, with her right breast covered and filled with "lumps" the size of nuts; the skin tumors were evidently of a melanotic nature, and extended to the integument covering the sternum and abdomen, some few being in the back. The axillary glands were much enlarged. On going into the history, this woman had had a black tumor the size of a walnut removed ten months previously from her left fore-arm, which had originated in a mole, and had been growing one year. The cicatrix of the operation wound was sound.

Case VIII.—Melanotic sarcoma of breast following the excision of a melanotic tumor originating in a mole over the sternum.

On October 18th, 1867, I was consulted by a Mrs. M., a married childless woman, aged 55, from whose sternum a tumor had been removed four months previously, which had been growing four months in a black mole. It was removed by Dr. Richards, of Redruth, when about the size of a duck's egg, and was supposed to have been a cancer. When I saw the patient there was clearly a melanotic growth in one breast, and many disseminated tubercles of melanotic sarcoma scattered over the sternum, breasts, abdomen, and enlarged lymphatic axillary glands, for which no operation was justifiable.

In Chapter XX., which deals with associated growths of different kinds, two cases, VIII. and IX. will be found in which carcinoma of the breast and melanotic sarcoma were found in the same patient.

CHAPTER XII.

CARCINOMA OF BREAST

(AN EPITHELIAL INFILTRATING GROWTH).

Carcinoma always originates in epithelial tissues, and is composed of epithelial elements.

These elements invariably infiltrate the tissue in which they are placed, and spread from their primary seat to neighboring structures by a progressive infiltration, so that as the disease advances, skin and fat, muscles, bone, nerves, and vessels eventually become involved, although the structures named vary in their powers of resisting the infiltrating tendency.

In carcinoma of the breast, the gland structure is the one primarily involved; and the epithelial elements of which it is composed partake of the anatomical characters of the normal epithelial lining of the ducts, or acini. The cells in the early stages of disease, where they are in contact with the basement membrane of the gland, are arranged with a certain kind of regularity; but at a later period they are most irregular, in the lumen of the duct, in the centre of the acinus, and in the connective tissue of the parts outside the basement membrane; the vessels of the growth are distributed to the fibrous stroma of the tissue infiltrated, and not, as in connective tissue or sarcomatous tumors, between the cells.

The epithelial cell elements in their infiltrating progress affect the invaded tissues in a particular way, and the cells in an early, if not in the earliest period of disease are found to be placed between the normal fibres, ducts, or gland elements of the invaded structure in what are called alveolar spaces. These spaces vary in shape, size, and in the arrangements of their epithelial contents, and each alveolar arrangement apparently depends, in the early period of disease, upon the anatomy of the tissue primarily infiltrated.

The alveolar spaces, whether large or small, freely communicate with one another in different places, and when a section of a tumor is made, and its surface scraped, the contents of the spaces readily escape as "milky" or "cream-like" cancer juice; this juice being composed of the epithelial cells, massed together, or floating in an albuminous fluid; the cells composing the juice being large or small, with one, two, or more round or oval nuclei.

This alveolar arrangement does not, however, hold good forever; it does so only so long as any normal tissue remains uninvaded or unchanged. For it is to be recognized that in all cases of carcinoma, as the infiltration of the epithelial elements progresses, so the disappearance of the tissue infiltrated is to be traced, until at last the natural structure of the invaded parts, even of bone, becomes entirely replaced by the carcinomatous elements. Over and above this, there is more or less in all infiltrating tumors a proportion of granulation or indifferent cells, from which of themselves the nature of the tumor could by no means be distinguished.

Neoplasms, like normal tissues, are liable also to certain pathological processes, and tumors of the breast are obedient to this law; thus they may inflame and suppurate, or ulcerate, and they may likewise undergo chronic degenerative changes. The life history of these epithelial or carcinomatous infiltrating tumors is not usually a long one, and every such tumor having arrived at maturity, begins to degenerate and to die, the process of death being in some cases slow, in others rapid. When slow, the process is by what is known as caseation; when rapid, by sloughing; this latter process, in some cases, being apparently helped by what much simulates an inflammation. At times a tumor may caseate in its centre and break down, so as to form a cavity containing a bloody or serous fluid simulating a cyst. In rarer cases the growth will undergo what is called the "colloid transformation," a form of degeneration peculiar to carcinoma, and not known to occur to the sarcomatous group. Of external tumors, those of the breast are mostly liable to this form of degeneration, whilst the more common examples of colloid transformation have been usually met with in the abdomen. In this change the growth becomes a gelatinous mass of a yellow or pinkish-red color, and on section this material flows like transparent honey

or mucus; it differs, however, from mucus in not being rendered opaque by acetic acid, and in containing sulphur; the alveoli of the changed growth enormously increase in size, and the epithelial cells of which it was composed swell into glistening globes, unaltered epithelial cells being often found in the centre of the mass.

In what way the epithelial cells of carcinoma that infiltrate the invaded tissue are formed and propagated may be open to dispute. In some cases it would appear that from either a known or unknown source of irritation, the natural elements of the epithelial tissue increase and multiply, and following the line of least resistance, dip into the tissues upon which they are placed, and so infiltrate them.

In others, where glandular structures are involved, as in the breast, the epithelial elements may first collect within the acinus, or tubule of the gland, and then make their way into the tissues outside, from rupture of the basement membrane of the acinus wall.

In a third class of cases, or perhaps in all to a degree, the disease spreads by what is called "*infection*," that is, the aquired power possessed by the developed morbid epithelial cells, when coming into contact with embryo undeveloped cells, of influencing their development, and causing them to take on the epithelial form. In the same way as in the cicatrization of a granulating wound, the epithelial cells of the true skin at the margins of the sore influence the embryonic granulation tissue elements in contact with them to form new skin.

How far this "infecting" power influences the young connective-tissue cells to assume the epithelial form in the growth of tumors, which originate in a glandular organ, and secondarily invade connective-tissue structures, it is not possible to say; although it is probable that such an influence is an important one, since it is certain that epithelial growths increase rapidly as soon as their epithelial elements have escaped from the acini of the gland, in which they originally increased and multiplied, by what is known as ordinary generation, and become disseminated into the fibrous or connective-tissue structure around the gland.

So long as a new formation in a glandular organ is confined within the limits of the organ; so long as it retains both in structure and function the type of the normal tissue, it con-

stitutes an adenoma. But when the new growth "becomes destructive toward the surrounding tissues," when it proceeds to infect the neighborhood, it becomes cancerous. The additional element in the case of cancer is clearly secondary to, and not co-ordinate with, the initial disturbance. Epithelial cells, and in fact the same kind of epithelial cells, are produced in two ways, but the two modes of formation do not belong to the same category; the one is a modification of healthy action, and the other is simply a mimicry of the original departure from the normal.

Carcinomatous tumors, moreover, at some time of their history cease to be local diseases; and it seems probable that this great change in the clinical character of the disease is marked by the pathological change, to which attention has just been drawn, namely, the escape of the epithelial elements through the basement membrane of the tube or acinus in which they primarily grew, and the secondary infection of the surrounding connective tissue by the epithelial elements.

"The cancerous element in the disorder," writes Creighton, "first shows itself when the infiltrated epithelium produces what we agree to call infection of the connective-tissue cells with which they are in contact."

How Cancer Spreads.—When a cancer or carcinomatous growth ceases to be a local disease, it spreads in three marked ways: by "continuous or local infection," by "lymphatic infection," or by "secondary vascular infection;" and whilst in any given case one form of infection may be more marked than another, in others all forms may exist together. In the breast any one or all may co-exist.

By "continuous local infection" is meant the gradual involvement of surrounding structures, in the order of their arrangement, around the primary seat of the disease, by progressive infiltration, as well as by extension along the perivascular sheaths of the blood-vessels of the diseased part; this being a common feature of scirrhus.

By "lymphatic infection" is meant the infiltration of the lymphatic glands associated with the primary diseased centre, or its coverings, by the lymphatic ducts, the elements of the disease being carried either by the lymph to the glands, or the lymphatic ducts themselves becoming directly infiltrated.

By "secondary or vascular infection" is meant the prop-

agation of the disease by other than the two methods already described, and probably by the blood currents; the evidence of this infection being afforded by the existence of one or more secondary growths, similar to the primary growth, in the viscera or other parts of the body, as, for example, in the pleura or liver in cases of scirrhus.

Local recurrence after removal of the primary growth in apparently the most complete manner is another sign of malignancy which is common to the carcinomata, as well as to some forms of sarcomata. It is a common feature of breast cancer.

With these general remarks on carcinoma, I will pass on to consider the disease as it affects the breast, and is seen at the bedside.

Signs and Symptoms of Carcinoma.—When a surgeon finds in the functionally inactive breast of a woman over forty years of age, or in one even ten years younger, a thickening or induration and apparent infiltration of one of its lobes, and with this local infiltration he fails to discover any other symptom or sign of a local inflammation, he is at once led to suspect the existence of a carcinoma; and when in the course of a few weeks or months the infiltrated lobe has increased in size, or the infiltration has spread from the lobe of the gland in which it originated, either to other lobes, or to some of the tissues that cover or lie beneath the breast, the diagnosis of a scirrhous carcinoma, or a cancerous tumor of the breast is plainly confirmed; the spreading of the local affection being indicated by either a "dimpling," or "puckering" (Plate III.), or infiltration of the skin covering in the lobe, or by diminished freedom of movement of the breast over the pectoral muscle.

When, again, a pathologist makes a section of a tumor involving the breast, and the section cuts crisply and becomes concave, shows a glistening surface of a grayish-white color, and dotted over with yellow spots and streaks; when he finds the disease to have originated in the gland structure, and to have infiltrated its tissues as well as to be deficient in everything like a capsule; when he scrapes the cut surface, and the scraping yields a milky juice (cancer juice), which under the microscope presents epithelial cell elements, with large round or oval nuclei of great variety; and when, on a closer histological examination, sections of the growth are made, and the

pathologist discovers that these epithelial elements have been scraped from larger or smaller slit-like oval or rounded alveolar spaces lying between the tissues of the affected lobe or gland, and that these epithelial elements otherwise possess no definite order of arrangement, he at once pronounces the disease he is examining to be carcinomatous or cancerous.

It must be understood, however, that there are no such special cells as "cancer cells." Those found in cancer are truly epithelial, but they are enlarged and deformed, many of which possess multiple nuclei, and are very prone to undergo fatty degeneration. Their arrangement also differs widely from the normal: they have no such regularity in their arrangement upon their basement membrane as seen in the adenomata, but their membrana propria is destroyed, and the lymph spaces of the connective tissue are infiltrated by the solid cell cylinders.

Should the pathologist, on further dissection, discover that the tissues outside the area of the gland are involved in the disease; that no boundary line of any kind can be made out to exist between the healthy and diseased parts; that the capsule of the gland where it originally encased the healthy lobe has disappeared, and been replaced by a new cell growth; and that this same form of neoplasm which originated in the centre of the diseased gland has radiated outwardly through the capsule of the gland into the fatty structure that surrounded it, and probably through this fatty structure either to the skin or the muscles beneath, so as in the former case to bring about, first, a drawing downward of this structure (dimpling, Plate II., Fig. 1), secondly, early infiltration (puckering, Plate II., Fig. 2), and thirdly, marked infiltration (induration), or in the latter case fixedness of the growth and its immobility from the pectoral muscle: when these facts are discovered the diagnosis of cancer is absolute. Indeed, both the clinical as well as pathological facts demonstrate that the disease, which began by infiltrating a lobe of the gland, has spread rapidly by the same infiltrating process; that it has passed from the lobe primarily involved through its capsule, and from this through adipose and connective tissue, either to the skin itself or pectoral muscle beneath, so that at last the skin had become infiltrated, and so changed. For carcinomatous infiltration of any tissue means eventually epithelial

substitution; and tissues that are at first invaded or infiltrated, in the course of time entirely disappear, their elementary tissues steadily giving way under the infective influence of epithelial infiltration; so that at length the natural structure of the mammary gland becomes superseded by the epithelial elements.

From these considerations it may be asserted that four main pathological points so far stand prominently forward in carcinoma of the breast. The first being that the disease is an infiltrating one; the second, that the infiltrating elements are epithelial, and nothing else; the third, that whilst the disease may have originated in one structure, say one lobe of the breast, it will eventually locally infect neighboring structures by a progressive infiltration (extension by local infection); and fourthly, that the normal structures invaded or infiltrated will eventually be destroyed and superseded by the epithelial infiltrating material.

Cancerous tumors, however, whilst they locally spread by local infection, do so in other ways, and of these, the method by lymphatic infection is the most frequent, the epithelial elements being either carried directly by the lymph stream from the lymphatic spaces of the infiltrated tissue, through the lymphatic ducts, to the neighboring axillary, clavicular, or substernal glands, or the walls of the lymphatic ducts themselves become absolutely infiltrated with the cancerous elements, and thus the local disease is conveyed by direct extension to the lymphatic glands themselves. It is probable that both these two methods have their influence, and that the first is the more common.

Again, carcinomatous disease spreads by "vascular infection," that is, by the blood-vessels, and so becomes disseminated broadly into the viscera and other distant parts of the body; local infection, lymphatic infection, and vascular infection being the chief methods by which cancerous disease spreads.

The Varieties and Macroscopical Features of Carcinomatous Growths.—There are clinically six classes of cases of carcinoma of the breast, although "the varieties of carcinoma are determined by the relative proportion of the stroma and cells, by certain degenerations and transformations, and by the accidental formation of cysts" (Gross).

1. The very slowly growing, and subsequently atrophying,

scirrhous carcinoma (Plate II., Fig. 3; Plate III., Fig. 3; Plate III., Fig. 5).

2. The more common variety, or hard, fibrous, infiltrating form of carcinoma (Plate III., Fig. 2).

3. The soft, more cellular, and encephaloid variety (Plate III., Fig. 4).

4. The acute brawny cancer (Plate II., Fig. 7).

5. The colloid cancer (Plate II., Figs. 7 and 8).

6. The cystic carcinoma (Plate IV., Fig. 4).

The first variety (Plate II., Fig. 3), or the very slowly growing, and subsequently atrophying, form of scirrhus, is the hardest kind met with, and is often described as stone cancer; it rarely attains any large dimensions, and is characterized by its peculiar power of contracting all the tissues involved in its infiltrating influence into little more than a puckered scar, with a central hard stony nucleus. When the centre of the breast is its starting point, the breast gland, with its nipple and skin covering, may all be drawn together into a cicatrix-like fissure. And when the primary growth occupies the periphery of the breast gland, the same contractive powers will be visible, although without any retraction of the nipple. In Plate III., Figs. 5 and 6, this condition is well illustrated.

The disease may progress so slowly as to last twelve, or even twenty years, and at the end appear only as a local disease; whilst in other cases a tumor, that for years had grown but slowly, may suddenly take on active growth, and develop into an acute or subacute form of cancer.

During the progress of this withering scirrhus, tubercles may appear in the skin of the primary growth and in this neighborhood, which may appear and even disappear, the disease progressing and receding at the same time. Should the growth be irritated or interfered with, it may become active, and what has been a local disease will become a general one by lymphatic and vascular infection. Patients the subject of this form of cancer, as a rule, die from visceral metastatic growths rather than from the local disease. A section of a tumor, such as the slowest growing of this series, will cut crisply, present a concave surface of gray appearance, with the remains of old gland ducts. There will exude from its surface but little juice, and this juice will contain but few epithelial cells; and what are seen will probably be undergoing fatty

or granular degenerative changes. The fibrous stroma will be abundant, and the alveoli which contain the epithelial elements will probably only show as slits or fusiform clefts. This form of carcinoma may clinically for a long period be regarded as a local disease, although at a later period it spreads by lymphatic infection.

In the following brief notes of cases, many of these points will be well illustrated.

Case I.—Carcinoma fibrosum of right breast; disappearance of local disease by natural processes; death of patient of chest disease seventeen years after first appearance of disease.

H. B., a healthy-looking, childless, married woman, aged 53, came under my care in January, 1857, with an ulcerating carcinomatous tumor of her right breast. The disease had existed for six years, and ulceration had been present for four. The cancerous surface was about the size of the palm of the hand. It was of stony hardness and firmly fixed to the muscles. Its edges were nodular and crumbly; the axillary glands were also enlarged. Her general health was good, and as the tumor caused little pain, operative interference was rejected. In March, 1858, fifteen months later, the tumor had become much smaller, and several pieces the size of nuts had fallen off, having apparently been destroyed by the contraction of the fibrous elements of the neoplasm. The growth as a whole was much harder. General health still good. October 20th, 1858, six months later, much of the original tumor had crumbled away, and the tumor was much smaller. Some tubercles had, however, appeared in the skin over the sternum.

April 21st, 1859. Tumor continues to contract, and to throw off pieces. The tubercles in the skin are likewise contracting and becoming paler.

November, 1859. Axillary glands becoming smaller and more indurated.

July 23d, 1861. The breast has nearly cicatrized, a mere linear puckered scar remaining, in which are one or two small hard white tubercles. All the secondary tubercles of the integument have disappeared.

January 3d, 1862. Nearly cured.

June 1st, 1862. Only one small tubercle the size of half a nut

remains in the cicatrix. No fresh tubercles have appeared. The glands in the axilla can hardly be felt.

March 31st, 1863. Breast shows merely a cicatrix, in which there is only one small nodule the size of a pea. The woman in all other respects is well.

May 30th, 1864. The breast is still in the same condition; one or two tubercles have appeared in the integument near the cicatrix, and have again disappeared. Two tubercles are, however, still present.

June 30th, 1864. The patient considers herself to be well. Her skin tubercles cause no pain or inconvenience. This is the last note of her case I have, but I learnt later that this patient died in 1870 of some chest trouble. The local disease had not increased.

Case II.—Atrophic cancer, twelve years' growth; patient survived fifteen years.

Miss B., aged 50, who had had atrophic cancer of her left breast for twelve years, with enlarged axillary glands, came under my care on September 13th, 1868, when the nipple and skin around, and breast gland were all involved in a hard, puckered, cancerous tumor. This patient lived for three years and died from some acute chest trouble.

Case III.—Atrophic cancer of twenty years' standing.

Jane H., aged 72, the mother of two children, and a widow of fifteen years, came under my care in 1869 with a puckered carcinomatous infiltration of her left breast of twenty years' existence. The whole gland, and the skin over it, and the axillary glands were involved, although the nipple was natural. Secondary tubercles were very general in the skin. This patient died one year later of asthenia.

Case IV.—Atrophic cancer of breast, nine years.

Bridget M., aged 56, the mother of three children, came to me on August 18th, 1868, with an atrophic cancer of her left breast, which had existed for nine years, with skin tubercles for the last two years over the breast and surrounding skin. She was steadily losing strength, and died within a year.

Case V.—Atrophic cancer of breast, eight years.

Ann H., aged 69, the mother of one child twenty-eight years old, came to me on May 31st, 1866, with infiltrating carcinoma of the left breast of seven years' growth. The nipple was retracted and the axillary glands were enlarged. The skin over

the breast was only puckered, not infiltrated. This patient, I believe, lived three or four years after my seeing her. The cause of her death is uncertain.

Second variety (Plate II., Figs. 1 and 2; Plate III., Fig. 2).—The second or more common variety of the hard, fibrous, infiltrating form of cancer differs only from the last, or atrophying kind, in that it is more rapid in its progress, and does not tend to wither. In it the bundles of fibrous tissue are abundant and the cell elements comparatively limited; at the same time they are far more abundant than they are in the atrophying kind. The alveolar spaces which contain the irregularly heaped-up cells are ovoid or round, and the disease runs its course far more rapidly; three years being about the average duration of life of a person who is the subject of it. This variety of cancer is the common form, as met with in practice.

The tumor rarely attains a size larger than that of an egg, but it never retains the smoothness and regularity of its shape. It has always an irregular bossed outline, and may affect the skin in ways to be described (Chapter XIII.). A description of a section of this tumor has been given (page 147), the tumor, taken as a type of carcinoma of the breast, having been drawn from this group, since it is the most common.

Third variety (Plate II., Fig. 4; Plate III., Fig. 4).—The soft tuberous, or encephaloid variety of carcinoma is likewise an infiltrating one, but it differs from the two preceding varieties in being larger in size, more rapid in its growth, and softer in its consistence. It may readily be broken down by the finger. On section it has a homogeneous, brain-like, white or mottled pink or red surface, with probably some more or less extensive local extravasation of blood within its structure. In parts, the tumor may be breaking down from degenerative processes. The cut surfaces are less concave than are the scirrhous forms, and much juice exudes from them. The juice contains abundant cell elements; a fine section of the tumor shows little fibre tissue, but large, round, alveolar spaces filled with round large cells.

Fourth variety (Plate II., Fig. 7).—The acute brawny cancer, although it simulates the last two varieties, is a variety by itself, in that it is an acute disease, and appears as a rapid

infiltration of a breast with the skin over it. The nipple, as a rule, is retracted and much depressed; the soft parts around it are raised, and the nipple depression is thus made apparently greater. Occasionally, as in Plate II., Fig. 7, the nipple is infiltrated and raised; the skin over the breast is brawny with infiltration, and at times it may be œdematous, so as to pit on pressure; it may likewise be injected as if inflamed, and hot to the hand.

In other cases the skin over the infiltrated breast gland will be indurated and tuberculated, the skin and the tumor having become by local infection one infiltrated carcinomatous mass.

A section of such a tumor will be firm, but not so hard as in class 2, or so soft as in class 3; it will present on section a white glistening appearance, with abundance of cancer juice containing cell elements (Plate III., Fig. 4). The fibre tissue will not be very abundant.

To the pathologist's eye the disease will probably be able to be traced from the gland or lobe in which it originated into the neighboring structures, and even into the skin, the section of which will be thick and white, from the infiltration of the epithelial cell elements.

This form of cancer of the breast is the most acute met with, and the most rapidly fatal; it may run its course in a few months. It is a type of an acute infiltrating neoplasm.

Fifth variety.—*Colloid carcinoma* (Plate III., Figs. 7 and 8).—This is a degeneration of a carcinomatous growth to which attention has been drawn (page 144, and also at page 196).

Sixth variety (Plate IV., Fig. 4.)—The cystic carcinoma will be considered under the heading of cystic disease of the breast. The existence of cysts in the carcinomata clinically separating cases which contain them from the more solid varieties of the disease, in the same way as the presence of cysts renders a different consideration necessary of the cystic and solid forms of adeno-fibromata and sarcomata.

Of the first four classes just described, there are endless intermediate varieties; and there is a chain of connection which links at one end, class 1, as represented by a small tumor of stony hardness, which has slowly drawn to itself, by local infection and infiltration, breast tissue, with its coverings, so as to appear as an indurated, puckered, and painless nodule, with

classes 3 and 4 at the other end, which exists as a soft, rapidly growing, succulent tumor, the size of a fist or cocoanut, having a rounded nodular outline and elastic feel, with full veins coursing over the skin which covers it, or with the skin mottled, infiltrated, and consequently adherent to the parts beneath.

In the former case the growth will have been of slow growth, even of many, say twenty, years; in the latter case it will have been of rapid growth, probably of weeks.

Neither of these extreme types is, however, of frequent occurrence, as one represents the withering or atrophying form of scirrhus, and the other the exceptional encephaloid or tuberous kind.

Influence of Sex.—Carcinoma of the breast is met with in both sexes. Mr. W. R. Williams, in his work on "The Influence of Sex in Disease" (1885), tells us that from an analysis of all cases admitted into the Middlesex, St. Bartholomew's, St. Thomas's, and University College Hospitals, during ten, twelve, and seventeen years, ending 1883, "out of 11,100 cases of tumor, 53 per cent were cancerous; out of 5,978 cases of cancer, 24 per cent were of the breast, and out of 1,433 cases of cancer of the breast consecutively observed in the above hospitals, 14 were in males.

Two out of every five cases of cancer in women are of the breast; one out of every three is of the uterus.

There is but one case of cancer of the male breast to 101 of the female breast.

Out of one hundred consecutive cases of carcinoma of the breast which I have observed, six have been of the atrophying form (class 1), ninety of the ordinary scirrhous variety (class 2), and four of the brawny kind (class 4).

What has been usually described as medullary or encephaloid cancer I now believe to have been probably of a sarcomatous nature; although some of the cases may have been of the tuberous variety, class 3. The fact of a tumor being encephaloid and limited by a membrane clearly excludes it from the carcinomatous series, carcinoma under all circumstances being an infiltrating neoplasm. Paget believes that there are about five cases of encephaloid carcinoma in ninety-five of scirrhus; whilst Lebert states that in France one case of encephaloid is met with in every five cases of carcinoma.

Influence of Age.—Carcinoma is not a disease of young life, although Mr. Lyford has recorded[24] a case in which it was found in the breast of a girl, aged 8; Mr. B. B. Cooper has reported a second[25] in a girl, aged 16, and in the Museum of St. Bartholomew's Hospital there is a specimen which was taken from a girl, aged 16.[26] Dr. Henry, of Breslau, recorded a fourth case in a woman, aged 21; and Mr. Tilley a fifth in a woman, aged 26. I have seen one example in a woman, aged 25, and two examples in women, aged 28, one of which was of the scirrhous variety, and the second of the acute brawny kind. Within the last few weeks I have seen a case in a young married woman, aged 26, in whom the disease appeared during pregnancy. It had all the features of the brawny variety. Nothing could be done for it.

An analysis of 600 consecutive cases of my own tells me that:

In 25 cases, or 4%, the disease was discovered before 30 years of age.
In 163 " or 27%, the disease was discovered between 31 and 40 years of age.
In 216 " or 36%, the disease was discovered between 41 and 50 years of age.
In 150 " or 25%, the disease was discovered between 51 and 60 years of age.
In 44 " or 7%, the disease was discovered between 61 and 70 years of age.

In 2 cases the patients were over 70 years of age.

The statistics of other authors are very similar to these. Thus Sir J. Paget found that of 400 cases, 98 appeared before the age of 40, or 24.5 per cent, and 302, or 75.5 per cent, after that age.

From these facts it is clear that only three out of every ten cases of carcinoma attack the breast of women during the period of its functional activity, that is, before the age of 40; seven cases out of every ten occur in the breast gland during the years of its functional decline, that is, after the age of 40; the decennial period between the ages of 41 and 50 being the one in which the disease is the most prone to appear. The conclusion is clear that in exceptional cases the disease may appear early or late. Independently of the cases analyzed I have seen one which appeared at the age of 96, in the

breast of a lady who had had many children, and died from old age; and a second which was discovered at the age of 86. Mr. Ashhurst saw one at the age of 89.

Social Condition and Fecundity of Patients.—Of the 600 women who had carcinoma, 485, or 80 per cent of the whole number, had been or were married; 115, or 20 per cent, were single. Baker's statistics are about the same: 77 per cent were or had been married, and 23 per cent single. Gross, on the other hand, out of 688 cases, found the married bore the proportion to the single of 88 to about 12 per cent, the proportion of single being less than my own tables show.

Of the 485 women in my own table who were or had been married, 360 were prolific, or 74 per cent, and 125 sterile, or 26 per cent. A large proportion of the prolific women were so to an extreme degree, ten and more children to one mother being a common note to find recorded. Winiwarter has noticed this same point, six children in his cases being frequently recorded to one mother. The breasts of married women and of those in whom the gland has been the most active are apparently more liable to cancer when the period of gland activity has passed than are the breasts of single women. A gland that has been functionally active being more prone in its period of obsolescence to become the seat of carcinoma than another which has never been called into activity.

The above facts show how erroneous is the common assertion that the unmarried women are more liable to carcinoma of the breast than the married.

Breast Involved.—In 300, or half of the 600 cases, the right gland was the seat of disease; in 272 the left; and in 28 both glands were involved; double cancer being apparently present in 5 per cent of all cases, or in 1 in every 20.

Influence of Menstruation.—My own facts are not clear enough upon this point, but Birkett, who is known to be a very careful observer, states, "that in a large majority of the women who have cancer of the breast the function was persistent at the moment of the development of the disease." That is, in 70 per cent of his cases the catamenia were persistent, and in 30 per cent it had ceased. Gross states that in his cases 61 per cent of the women were menstruating, and in only 6.4 per cent of them was there irregularity in the

performance of that function. In 39 per cent the catamenia had ceased.

Winiwarter does not believe that menstruation has any etiological connection with carcinoma, and in this I quite agree.

Duration of Disease when first Seen.—This point was noted in 504 of the 600 cases.

In 221 the disease had existed under a year.
In 165 it had been discovered between 1 and 2 years.
In 39 it had existed between 2 and 3 years.
15 per cent over 3 years.
In 25 it had existed between 3 and 4 years.
In 22 it had existed between 4 and 5 years.
In 15 it had existed between 6 and 7 years.
In 10 it had existed between 8 and 9 years.
In 7 it had existed from 10 to 20 years.

From these facts it is clear that in three out of four cases of carcinoma of the breast the disease when first seen by the surgeon has usually existed for less than two years. In the fourth case it has existed from two up to twenty years. In the majority of these latter cases, and in all those that had given a history of more than four years' duration, the disease was probably of the atrophic kind. I should not, however, have believed, if I had not made the above analysis, that so large a proportion of the cases of carcinoma of the breast of which I had taken notes had been of so chronic a nature as these facts indicate, for it is to be remembered that these figures give the duration of the disease before treatment, and if the benefit of treatment is added, a considerable extension of time would probably have to be given.

If we accept Paget's conclusion, that the average duration of life in carcinoma of the breast is about four years, and my own cases confirm this view when thus divided, we must accept as equally true a more important and hopeful conclusion, that a large number of patients, approaching a third of the whole number, survive this period for months or years. This conclusion will be very palpable on looking at the following table, composed of an analysis of 72 operation cases, the results of which I have been able to trace.

Table showing the duration of life of 72 cases after the car-

cinomatous tumor had been discovered, all of which had been operated upon with success.

In 8, or 11%, the disease ran its course within 12 months.
In 16, or 22%, patient died between 12 and 24 months.
In 16, or 22%, patient died between 24 and 36 months.
55.5% died within three years.
In 10, or 14%, patient died between 3 and 4 years.
In 2, or 2.7%, patient died in the fifth year.
In 8, or 11%, patient died between 5½ and 6 years.
In 2 or 2.7% patient lived eight years.
2 lived nine and 6 ten years, or 14% over six years.
44 per cent over three years.

55 per cent of the whole number sank within three years, and 44 per cent over three years; these proportions being precisely those brought out by Sir J. Paget in his analysis of cases which had not been interfered with. But my table tells us likewise that 18 out of the 72 cases, or at least one-fourth of all cases operated upon, lived from 5 to 10 years.

It is well, therefore, to have this fact always before us, and that whilst we assert in all truth that one-half of our patients will die within the three years, we can with equal justice lead any individual patient to hope that her chances are equally good to live from 5 to 10 years. Indeed, we may with a clear conscience admit, that whilst one-third of all cases die within two years, two-thirds will live from 3 to 10 years; half of these surviving from 5 to 10 years.

The surgeon, with these facts before him, is therefore justified in placing before any individual patient the same hopeful aspect of her case, and thus giving encouragement where so much is needed.

I quote Paget's table of 61 cases, the records of which were complete, since it deals with cases which have not been interfered with, whereas my table includes only cases after operation.

34 cases under 3 years, or 55 per cent:
7 died between 6 and 12 months.
7 died between 12 and 18 months.
8 died between 18 and 24 months.
10 died between 2 and 2½ years.
2 died between 2½ and 3 years.

27 cases over 3 years, or 46 6.2 per cent:
12 died between 3 and 4 years.
6 died between 4 and 6 years.
3 died between 6 and 8 years.
1 died between 8 and 10 years.
5 died between 10 and 20 years.

Baker gives the average duration of life 43 months; Sibley makes it 32 months; Gross only 27 months without operation, and 39 months with.

Carcinoma of the Breast Complicated with Pregnancy.—Should the breast of a pregnant woman be the seat of cancer, the disease as a rule will progress rapidly, and should the stage of suckling be reached, its increase will be still more rapid. These cases are happily rare. I record a few examples.

Mr. Annandale reports that he once operated upon a mother and daughter for scirrhus of the breast, both within two weeks; the daughter was nursing when the disease first showed itself, and in her case its progress was much more rapid than in the case of her mother; and further, the disease returned in the daughter's breast much earlier than in the mother's.

Case I.—Extensive cancer of breasts and integument of the chest and abdomen, associated with pregnancy following suppuration of breast; death in eighth month of pregnancy.

Mrs. M., aged 35, the mother of nine children, and the first eight of which she suckled, came to me in 1868, when she was four months pregnant, with the right breast and skin over it, as well as the integument of the chest, side, and abdomen, generally infiltrated with carcinoma. In fact, she was skin-bound. The breast with the skin in several parts was ulcerated. The right axillary glands were enlarged, and the right arm œdematous from venous obstruction. The disease in the right breast had appeared as a lump in the gland, which was left after an abscess that formed when suckling her eighth child two years previously. The left breast was likewise infiltrated with carcinoma, and this had followed an abscess after the ninth child, ten months previously.

This patient died from asthenia about the eighth month of her pregnancy.

Case II.—Cancer of breast, followed by pregnancy, and miscarriage; after which rapid growth of disease; death.

Mary L., aged 44, the mother of four children, all of whom she suckled, came under my care on January 19th, 1865, with carcinoma of her left breast. The disease had been coming for two years, and had increased slowly; seven months ago she became pregnant, since then the disease has progressed more rapidly; she miscarried at the fifth month, that is, seven weeks ago.

At present the mammary gland as a whole is infiltrated, and fixed to the pectoral muscle; the skin over the gland is fixed, puckered, infiltrated, and ulcerated around the gland; in the skin are many small tubercles of cancer; the axillary glands are slightly enlarged. Later on the ulceration spread fast, and the tubercles multiplied over the skin and on the right breast. In September the patient died with chest complication. Her paternal grandmother had died, aged 87, with chronic cancer of the breast; her paternal aunt also, with the same disease, aged 65.

Case III.—Cancer of breast coming on during pregnancy; acute progress involving both glands; early death.

Eliza S., aged 49, the mother of three children, whom she did not suckle, the youngest being four months old, came to me on March 18th, 1869, with a lump in her right breast, which she had discovered three months before her last confinement, and which had rapidly increased. When seen seven months after its appearance, the whole gland was infiltrated with disease and the skin over it was brawny. The tumor was fixed to the chest; the axillary glands enlarged. There was pain down the arm, which was œdematous.

Four months later the disease had affected the opposite breast, and the woman soon sank. The patient's mother had died from tumor, and her sister from cancer of the breast.

Case IV.—Cancer of breast with retracted nipple, which prevented suckling, following labor.

Mary B., aged 38, the mother of five children, the youngest being five months. She had suckled all with her right breast, but not with the left, as the nipple was retracted.

November 4th, 1869. The left breast was infiltrated with cancer, associated with enlarged axillary glands. It had com-

menced after her last confinement, five months previously. Six months later this woman died.

Case V.—Acute brawny cancer of breast, appearing during lactation.

Eliza W., aged 35, the mother of four children, the youngest being fifteen months, all of whom she had suckled, came under my care in January, 1871, with infiltration of the left breast and a brawny condition of skin over it. The disease began three months before, during suckling, as a lump which rapidly grew. The skin over the right breast was mottled and was already becoming infiltrated in lines, probably lymphatic. On March 2d the woman was sinking. Her mother's cousin had cancer, and two cousins, one paternal, and one maternal, had tumors.

General Condition of Patient the subject of Carcinoma.

An old prejudice still exists in favor of the presence of a cachexia in cases of cancer; although a very little clinical experience is wanted to learn that this prejudice is wrong, and that there are few patients admitted into metropolitan hospitals with a more general healthy aspect than those who have cancer of the breast. At least half the cases who have this disease present the appearance of perfect health. Two-thirds of the remainder look as healthy as the bulk of those who are doing the work of life well. Whilst in the sixth, not included in either of these classes, some general evidence of illness may be made out; the general evidence depending more upon mental anxiety and apprehension than any real influence of the disease upon the functions of the body. To see what is known as cachexia, the surgeon must go into the cancer wards of a hospital, in which the sufferers from cancer are retained until the end, that is, until life is slowly sapped by hemorrhage, discharges, pain, and the interference with some one or more of the important functions of the viscera from metastatic or secondary growths. These patients look ill and cachectic, it is true, but probably not more so than others who are suffering in an allied way, though not from cancerous affections. The cachexia of cancer, in fact, differs in no way from that of any other exhausting disease. When it exists it indicates the presence of some affection which is undermining the patient's strength, which may be cancer, but it may be any other form of disease.

The observations of other writers support these conclusions, for Gross states that fifty-one per cent of his cases were in good health, nineteen per cent were pale and thin, and twelve per cent were decidely broken down from the effects of the disease. He adds also that the nutrition of scarcely one in twenty suffers previous to sixteen months after the detection of the growth. Paget found that sixty-six out of ninety-one cases presented the characters of good health; nine were in but moderate health, and only sixteen were sickly.

Heredity in Cancer.—Out of my 600 cases of cancer, although carefully inquired into, I found it to exist in only seventy-three cases, or 12 per cent of the whole number. In fifty-four of these, cancer was reported to have occurred in one member; in sixteen in two members, and in three in three members. In fourteen of the seventy-three cases the relation was on the father's side; in thirty-five on the mother's side, and in eleven it was found among the brothers and sisters. In seven of the thirteen remaining cases it had attacked the aunts, in five the cousins, and in one the grandmother, my notes not stating whether maternal or paternal relations. These facts are enough to indicate that an hereditary tendency to cancer of the breast is by no means the rule (only 12 per cent), and that where it exists it seems to be more powerful on the mother's than the father's side.

Gross found a history of heredity in but 9.7 per cent; Paget in 33 per cent; Nunn in 29 per cent. Birkett is unable to support the argument of heredity. Nunn has, however, pointed out a fact of interest, and that is the longevity of the families of patients who have cancer of the breast. He found in 169 cases, that the average age of the fathers was sixty-two, and the average age of the mothers was sixty-one. That 106 of the patients had had grandparents who had lived over seventy years of age; sixty-two had parents who had passed the great age of eighty, and fifteen who had lived over ninety years of age; these facts neither suggest that cancerous patients come from a feeble stock, nor that they inherit the affection, but rather that the disease is an acquired and a personal one.

I may quote here a rare case of carcinoma which existed in mother and daughter at the same time.

Case I.—Carcinoma of the breast in mother and daughter; of slow growth in the mother, acute in the daughter; in the latter it had followed a blow.

In 1878 I saw Mrs. S., who was then 68, with carcinoma of the cicatrix of a wound which had been made thirty years previously for the removal of a cancerous breast of five years' growth. She had remained well after the operation for twenty-five years, when a return took place. When I saw her there was a tubercle the size of a walnut in the scar, with many other tubercles scattered in the skin over the sternum and opposite breast. Nothing could be done for her. She, however, brought her daughter to me, who was 50 years of age, with a decided carcinomatous tuber the size of a small orange in her breast, which had followed within a few weeks of a blow. The breast was wholly infiltrated, with the skin over it, as were also the lymphatic glands of the axilla and above the clavicle. Nothing could be done for this trouble, and the patient died within six months from probable internal thoracic cancer.

"When," says Darwin, "amongst individuals, apparently exposed to the same conditions, any very rare deviation, due to some extraordinary combination of circumstances, appears in the parent (say once among several million individuals), and it reappears in the child, the mere doctrine of chances almost compels us to attribute its reappearance to inheritance. Every one must have heard of cases of albinism, prickly skin, hairy bodies, etc., appearing in several members of the same family. If strange and rare deviations of structure are really inherited, less strange and common deviations may be freely admitted to be inheritable. Perhaps the correct way of viewing the whole subject would be to look at the inheritance of any character whatever as the rule, and non-inheritance as the anomaly."

If Paget's statement be true, as I take it to be, "that a mark once made on a particle of blood or tissue, is not for years effaced from its successors," why should we wonder at inherited tendencies in form and feature, in physiological function, and in pathological processes; why, indeed, should we not rather expect these inherited proclivities of tissues to have a greater effect, and look for more marked evidence of heredity in disease than we find to be the rule in practice?

The inheritance of a predisposition to disease is a very different thing to the inheritance of a disease itself. The former need never be made manifest; indeed, it is probable that, if it exists, it can be made to perish by the careful exclusion of all such influences as may bring it to light.

Causes of Carcinoma of the Breast.—All evidence tends to show that carcinoma of the breast, as of other parts, is in its origin more a local than a constitutional disease, and that it becomes a general one in a secondary way by what has been described as "local infection," "lymphatic infection," and "vascular or secondary infection."

To start in the breast, as elsewhere, some local source of irritation is required, and that local source may come from without in the form of an injury; or from within, either as some spurious functional activity, or degenerating involution change, or as some antecedent inflammatory change, which as an acute affection may have damaged, or as a chronic one may have irritated tissue.

It is now a recognized fact that persistent irritation of the skin may give rise to an epithelioma, and daily experience supports this view, particularly in disease of the lip, tongue, and penis. The growth of an epithelioma in the bladder of a man, who for years relieved himself by the frequent passage of a metallic catheter through a perinæal fistula, at a spot against which the catheter impinged, is an interesting illustration of this view. The irritation of soot as a cause of sweeps' cancer, and the irritation of common warts, are more familiar examples. The fact also that cancer primarily is most prone to attack the mucous canals at their narrowest parts, where friction is most felt, supports this view.

Persistent local irritation of an epithelial structure is consequently likely to produce a local cancer, and when this local irritation takes place in a gland, such as the breast (which is undergoing involution changes and becoming obsolete) the tendency to produce a carcinomatous tumor is increased; when, in addition to these local causes, there is added the predisposing influence of heredity, by which the members of a family tend to resemble not only their immediate parents, but to comprise in themselves the foibles of several generations, the pernicious influence of a local irritation is likely to become rampant.

That new tissues, such as cicatrices, are prone to become the seat of epithelioma, is well recognized; there is, indeed, no denying the fact that the cicatrices of burns, of old ulcers and stumps, are constantly the seats of cancerous disease, and more particularly when irritated; we need not, therefore, be surprised that epithelial gland structures, such as the breast, should occasionally become the seat of epithelial growths, after having been injured by some chronic or even suppurative inflammation; the carcinomatous disease not following at once the local affection which first injured the breast tissue, but attacking it, as it might a scar, at a more advanced period of life. the reparative material in the gland and in the scar being both new, and in a measure cicatricial. I have seen a cancerous tumor originate in the scar of an antecedent breast abscess, and many carcinomatous tumors have followed a previous mastitis.

Gross states that carcinomatous disease started from lumps, or chronic indurations left by puerperal mastitis in 8.21 per cent of the 365 women who had borne children; the lumps left by the mastitis having remained quiescent for a period which varied from four to twenty-eight years. My own statistics tell me that out of my 360 cases of women who had borne children, mastitis had occurred at some antecedent period in eighty, but it is almost impossible to make out that the cancerous tumor originated at the seat of scar or induration. The tumor in the majority of instances appeared many years after the mastitis; in one case thirty years.

In the following case carcinoma clearly originated in the scar of an operation made twelve years previously for a cystic non-cancerous tumor:

Case I.—Cystic degeneration of the breast, with enlargement of one of the cysts, and the development of an intracystic adeno-fibromatous growth; removal of the growth; twelve years later carcinoma of the cicatrix.

A healthy widow, aged 30, with one child ten years of age, consulted Mr. Birkett in October, 1859, for a small painless swelling, situated in the clavicular lobe of her left breast, which had been growing for seven months. The tumor was in a measure pear-shaped, with its narrow end near the nipple, nodular, and elastic. Pressure upon it caused a few drops of

a clear, yellow, viscid, albuminous fluid, to exude from the nipple, which was natural. The axillary glands were not enlarged. In December, 1859, the tumor was excised with some of the breast gland, and the patient recovered. On section the tumor was found to be formed of a cyst, which contained serum, and communicated with a duct near the nipple. Throughout the tissue of the lobe removed, and of the gland structure exposed by the incision, were small cysts, containing intracystic growths. There was no distinct, well-marked, limited envelope around the tumor, but the cyst and all the new growths were so closely identified with the ordinary tissue of the breast, that it was absolutely necessary to cut its structure in order to remove effectually the whole of the tumor. The intracystic growths were composed of the cæcal terminations of gland tissue and fibre elements, the former loaded with epithelium.

The patient remained well for eleven and a half years, when a carcinomatous tubercle appeared in the scar, which enlarged and ulcerated. In June, 1872, it formed an excavated ulcer, with thick everted edges one inch and a half in diameter; the axillary glands were enlarged. October 15th, 1872, the breast and growth were removed, the patient recovering.

Direct injury is, without doubt, a common cause of tumor formation, although not particularly of carcinoma. To say in what proportion such cases occur is difficult, and I am unable to add any statistical evidence upon the point, beyond that in two-thirds of my cases the disease was attributed by the patient to some such cause. Gross states that in 11.7 per cent, or 23 out of 270 cases analyzed by Winiwarter and himself, the disease was attributed to injury, as blows or contusions.

In the following case the cause and effect seem to be closely connected:

Case II.—Carcinoma of the breast in an old woman, aged 71, following a blow; it was ulcerating, and on that account was removed, and with good success.

Susan C., aged 71, came under my care in October, 1880, with an ulcerating carcinomatous tumor in her right breast, which had appeared within a few days of a blow she had received in the part ten months before admission. Two months ago this tumor had broken down and discharged. When seen

a carcinomatous tumor occupied the upper half of the gland. The skin over it was infiltrated and ulcerated. The nipple was retracted. Axillary glands not to be felt. The breast was removed, as the ulcerating surface was a source of distress and weakness, and the patient did well. The temperature after the operation never rose above 99°.

Eczema or ulceration of the nipple, as a precursor of cancer, is now a recognized cause, since it was pointed out by Paget, in the tenth volume of St. Bartholomew's Hospital Reports, published 1874, although in what proportion of cases the nipple trouble and the breast disease are associated is not yet evident. That eczema of the nipple may exist and get well, without giving rise to a cancer, is a clinical fact, as is likewise the formation of a cancerous tumor after the long existence of the nipple trouble.

Paget, in his paper, quoted fifteen examples, and described the disease as having "the appearance of a florid, intensely red, raw surface, very finely granular, as if nearly the whole thickness of the epidermis were removed; like the surface of very acute diffused eczema, or like that of an acute balanitis. From such a surface there was always copious, clear, yellowish, viscid exudation. In some cases the eruption has presented the character of an ordinary chronic eczema or psoriasis, the eruption spreading beyond the areola in widening circles, or with scattered blotches of redness covering nearly the whole breast. The eruption has resisted all treatment, both local and general, and has continued even after the affected part of the skin has been involved in the cancerous disease."

Butlin has added to this classical description of the local disease, as seen at the bed-side, some histological information, and has shown us how, as he believes, the carcinoma becomes a consecutive disease to the nipple affection.[27] "The activity and proliferation of the epithelium of the nipple is continued into the mouths of the galactophorous ducts; the same activity and proliferation can be traced along the ducts, in which the form of the cell is usually changed, and a spheroidal cell is substituted for the columnar cell, which naturally prevails there; these morbid conditions are continued deep down into the substance of the mammary gland, where the sacs become similarly affected."

"Coincident with the changes in the ducts and glandular epithelium, increased vascularity and the collection of cells resembling leucocytes are observed in the connective tissue immediately surrounding the glandular apparatus. But no direct connection can be traced between the changes within the ducts and sacs and those without them, and the latter are subordinate in character and degree to the former. Not until the disease is advanced, and a definite tumor has been formed, which can be recognized with the naked eye as carcinoma, are cells resembling those within the ducts and sacs found in the surrounding tissues."

At a later stage of the disease the ducts and acini of the gland will be found filled with proliferating epithelium, which eventually escapes from the ducts by rupture or growth into the surrounding tissues, thereby producing the full formation of carcinoma.

Dr. Thin,[28] who made a minute examination of the skin of the nipple and breast tumors in four of these cases, two of them having been subjects of operation by Mr. Henry Morris, one by Mr. George Lawson, and the other by Mr. Manby, of East Rudham, has taken a different view as regards the nature of the skin affection. In two cases of the disease which he had an opportunity of examining before operation, the clinical evidence was, in his opinion, against eczema, and in favor of an infiltration in the superficial layer of the cutis. Microscopical examination he considers to be decisive on this point, proving that the disease is not an eczema, the destruction of the cells of the epidermis and the breaking down of the bundles of white fibrous tissue in the papillary layer of the cutis being in excess of the changes which are found in cases of eczema. In distinguishing clinically this malignant dermatitis from eczema, Dr. Thin considers that the chief points to be borne in mind are the well-defined margin in the former, and the evidence, when the tissue is grasped between the fingers, of infiltration in the papillary layer. In two cases which came under his notice there was clear evidence that the disease began in a position corresponding to the openings of the galactophorous ducts, and remained limited in that position for some time before extending over the surface of the nipple. He considers the infiltrated condition of the areola, which in some of its features is so suggestive of eczema, to be produced by the

action on the connective tissue of a fluid which escapes from the mouths of the ducts, and which possesses the corrosive qualities of cancerous epithelium. He believes that the first morbid change is really a cancerous change in or near the mouth of the ducts, and that the so-called eczematous conditions are secondary to these changes. In all the four cases examined by Dr. Thin the cancerous tumors were of the variety appropriately termed duct cancer, the cancerous epithelium taking its origin not in the acini of the gland but in the epithelium of the ducts; the fibro-carcinoma cysticum mammæ of Waldeyer.

Dr. Munro [29] relates three cases bearing on this disease. In regard to one of them, he states that it is his firm belief that the primary sore was from the very commencement malignant disease of the epithelium at the mouths of the galactophorous ducts, and that the supposed induced or secondary disease in the breast stands in the same relation to the disease as the more distant glandular deposits.

Dr. Duhring [30] relates two cases which, he believes, show "that the disease is not an eczema, but that it is a peculiar disease with a malignant tendency." He remarks that in his two cases nothing of a malignant nature was suspected until after the lapse of five and ten years respectively, and that itching was in both cases insignificant until the affection had existed several years, in this respect the disease differing decidedly from eczema, where itching is one of the first signs noted. In regard to the clinical features, Dr. Duhring corroborates the description given by Dr. Thin. The circumscribed, sharply-defined lesion, and the slightly elevated border, are symptoms which, he states, do not obtain in eczema. "The brilliant color of the lesion is striking and is more marked than in eczema, the absence of the eczematous surface characterized by an appreciable discharge, or by vesicles, pustules, or puncta coming and going from time to time, and the absence of exacerbation so usual in eczema, may also be referred to." A point to which he also directs attention is the infiltration, "which is firm or even hard, but is not deep-seated. It is rather superficial. In eczema, on the other hand, it is soft."

This local disease, if eczema or otherwise, is therefore neither to be treated lightly nor disregarded, and the thought that it will eventually lead to, if it be not from the first, cancer, should be a prominent one in the surgeon's mind.

In most of the cases recorded, the nipple disease had preceded the breast disease from two to five or six years.

Gross and Oldekop's tables show that this eczema of the nipple preceded the carcinoma in 5, or 1.35 per cent, of 370 cases. Mr. Henry Morris[31] records two out of 305 cases. I have recorded but three examples in my 600 consecutive cases. I quote these three with others that I have extracted from my note-book.

Case I.—Carcinoma of breast, preceded by serous discharge from, and eczema of, the nipple; operation; convalescence.

Martha C., aged 33, came under my care in January, 1880, with a tumor occupying the upper half of her left breast, which had been growing for one year, with infiltration of the skin over it; there was likewise a local patch of eczema involving the areola, and half the nipple, which is retracted. She had, for some weeks before the tumor was discovered, a discharge from the nipple, and some scabbing at its apex. The axillary glands are enlarged.

The breast, tumor, and glands were removed with a good result.

Case II.—Carcinoma of the right breast, following eczema of the nipple; excision of tumor, which was a typical duct cancer; cure.

Jane G., aged 53, a healthy woman, the mother of several children, all of whom she suckled without difficulty, came under my care on January 28th, 1887, with a tumor in her right breast.

It had appeared four years previously, in 1883, as a small lump, the size of a pea, on the outer half of her right breast. It gave no pain, and she disregarded it. In August, 1885, the nipple became sore, and she sought advice. Some application was applied to the nipple, and the eczema improved, but never got well. The lump in the breast during this time had much increased. When admitted under my care into Guy's Hospital there was a patch of eczema, about the size of a florin, occupying the site of the right nipple, which had become obliterated. Behind and to the outer side of the eczematous patch there was a hard nodular tumor, measuring three inches transversely and about two inches vertically, in the substance

of the breast. The skin over it was not implicated, and the tumor moved with the breast freely over the deeper structures. It was not painful. An enlarged gland could be felt in the axilla.

On February 5th the tumor on the breast and its axillary glands were removed, and a rapid recovery took place.

Mr. Targett, the surgical registrar and pathologist, examined the tumor, and gave the following report: The microscopic examination showed the changes of chronic eczema in the nipple and areola. There was proliferation of the epithelium along some of the ducts and especially in the terminal acini. In the latter situation there was much small-cell infiltration around groups of acini, and in this manner they were converted into the alveoli of fully developed carcinoma. It is thus a good example of duct cancer following on chronic eczema of the breast.

Case III.—Eczema of nipple; cancer of breast.

Elize S., aged 62, who had been married 35 years, and had 6 children, came to me on February 19th, 1865, with an infiltration of the upper lobe of her right breast, which had existed for one year. For two years previously she had had eczema of her nipple, and during this time the nipple projected; for three years before the eczema appeared it had been retracted. In June, 1865, the skin over the breast was infiltrated with cancerous tubercles. I then lost sight of the patient.

This patient's mother died from cancer of the breast, and two of her brothers of internal cancer.

Case IV.—Paget's disease of nipple, followed by carcinoma; destroyed with cautery.

Mrs. B., aged 60, a married, childless women, came to me March 26th, 1877, with eczematous ulceration of the right nipple and areola, of four years' standing. The nipple had gone, and much of the areola. The surface was ulcerated, but not thickened. Total destruction of the whole surface with a cautery was carried out, and the parts healed. Some months later the hardness reappeared, and ulcerated, and in 1879 the right breast was excised, and convalescence followed; but the disease soon returned and, invaded the opposite breast. The patient died in 1882.

Case V.—Carcinoma of breast following eczema of nipple.

Miss S., aged 57, consulted me in May, 1875, for an eczema

of her nipple which had existed for many months. When seen by me there was marked infiltrating carcinoma of the breast; retracted nipple and a red raw surface in the position of the nipple and its areola.

Operation advised, but refused.

Case VI.—Carcinoma of breast following eczema of nipple.

Mrs. S., aged 45, the mother of five children, came to me in October, 1877, with an eczema or rawness of one nipple of two years' standing, following by swelling, hardness of the breast, with retracting nipple. This increased for nine months, and then ulcerated. When seen there was an open cancerous ulcer of the breast and nipple. Her mother is said to have died from cancer of the face.

Operation advised, but refused.

Mental anxiety as a cause of carcinoma must not be omitted, although to adduce proof of the truth of the proposition may be difficult; to say that it is an antecedent of many cases of carcinoma is, however, a fact which the experience of most surgeons would support. The late Mr. Charles Moore was a firm believer in its influence.

On the Influence of Locality in Cancer.—It is impossible to deny the influence of nationality and of geographical position upon the frequency of cancer. For in some countries little of it is seen, whereas, in others, it is met with frequently in certain districts, and in others but rarely. In Turkey, Greece, Syria, Persia, North Africa, and Iceland, it is very rare, whereas in parts of India and China it is more common. In Europe its relative frequency is very curious, and Hirsch tells that it varies from nearly 10 cases in 10,000 inhabitants, as met with at Trondhjem in Norway, and in Lombardy in Italy, to 2 in 10,000 in Sardinia. In America the death rate is about 4.5, and in England much the same, the rate apparently in our own land having increased during the last few decades; that ending 1859 having been 3.3, and that ending 1876 4.6 per 10,000. In all these statistical figures it may be fairly assumed that in women half the cases are affections of the breast and uterus.

Lastly, as one of the causes of cancer, and consequently of cancer of the breast, is the geographical distribution of the disease. Dr. Haviland having demonstrated by means of a

cancer chart collated from the records of the Registrar-General, and read before the Society of Arts in 1879, that there are certain localities in England in which cancer predominates largely over others, and he certainly has shown that these cancer fields lie along the low-lying alluvial beds of river courses, and the geological strata of the tertiary formation. "Cancer fields," he wrote, "are situated along rivers that occasionally overflow their banks."

Hirsch, however, is no believer in this theory or explanation, for he reminds us that in Norway, cancer occurs mostly in the mountainous districts, and at considerable elevations; also that in Mexico the high table-land is more subject to cancer than the low places.

By way of summary as to the causes of carcinoma, the following conclusions seem just:

1. That there exists in those who manifest the disease, and probably in many others who never live to do so, a predisposition to its development under any exciting cause.

2. That this predisposition is, to a degree, due to heredity, although sufficient evidence exists to suggest that the predisposition may be strengthened, or even acquired, either by long residence in low-lying districts in which rivers are prone to overflow their banks, or by the long-continued depressing effects of mental influences.

3. That the disease is, under all circumstances, primarily a local one, originating in a gland or tissue that has been the seat either of a direct injury, or that has undergone some degenerative change, the effects either of age, obsolescence, or some antecedent spurious functional activity, inflammatory action, or persistent local irritation.

CHAPTER XIII.

THE CLINICAL FEATURES OF A SCIRRHOUS CARCINOMA.

When a cancerous tumor has fully developed, and more particularly the first two varieties, it has features of so marked a character that its nature can hardly be misunderstood. When it is developing, its early features are ill defined and uncertain, consequently a positive diagnosis of its nature is difficult if not impossible; and yet it is at the very early stage of the disease that a diagnosis is most essential, since it is then, if at all, that a cancer may be regarded as a local and consequently as a curable affection.

It is to be remembered that in the majority of cases of carcinoma of the breast, the disease attacks the breasts of women about forty years of age when the procreative organs are verging toward their natural period of functional decline; and when the breast as a gland is either obsolete, or is passing into the stage of obsolescence. It is, however, found in younger, as well as in older subjects; when in the younger it usually appears as an acute or active affection, when in the latter as a more chronic one.

Early Local Symptoms of Carcinoma.—In the majority of cases when discovered it appears either as an ill-defined thickening of one of the lobes of the gland, or as a nodular swelling fixed closely to the tissue of the breast. It is generally found out by accident, as in washing, and the attention of the patient is rarely drawn to the part by pain; should pain be present it will generally show itself as an occasional shoot of pain, although sometimes as a sensation of heat.

With these early symptoms present, how is a diagnosis to be made; for what affections may the disease be mistaken? A few words upon these questions may be of value.

Should the disease appear as a mere thickening of one of the lobes of the breast, this clinical fact is one which of itself

should excite the apprehensions of cancer; for the thickening can only be brought about by one of two causes, either carcinomatous infiltration, or chronic inflammatory infiltration; and it must be admitted that too often to the touch these two forms of infiltration yield the same sensations. In cancer, however, in a large proportion of cases, the hardness is of a stony, unyielding character, and the examination, if not rough, is well tolerated; while in the chronic inflammatory condition the induration is fleshy and somewhat yielding, the same amount of manipulation likewise evokes pain. In the chronic inflammatory trouble there will likewise probably be more pain on gentle manipulation than is usually met with in cancer, and after examination the patient will show some signs of excitement or irritability. In this latter trouble, also, more than one of the lobes of the gland will probably be found coarse and knotty, although but one may be tender, and possibly the opposite gland will be equally affected.

In cancer, in brief, the disease starts in one lobe of a gland, and as an indolent swelling it is rarely associated with any signs or symptoms of local inflammation, such as may be made out in the chronic lobular inflammation of the breast, which is prone to attack women at the climacteric period. Cancer in its early stage is known more by the absence of symptoms than by anything more definite, by a painless, or nearly painless local, stony infiltration of a part. This stage of cancer may be described as the "early infiltrating stage." When the disease first shows itself as a nodular swelling fixed closely to the tissue of the breast, the same thought of carcinoma should be excited, but at the same time the possibility of the lump being due to the presence of an involution cyst should not be forgotten. The rounder the lump, the greater the probability of its being cystic; the more irregular and nodular the swelling, the greater the probability of its being cancerous. A hard, nodular swelling is more likely to be cystic than inflammatory, and it is at least as likely to be cystic as cancerous. For diagnosis an exploratory puncture with a needle is frequently demanded; or what is better, an exploratory incision.

As the disease advances, and reaches the stage which, for descriptive or clinical purposes, may well be called the "mature infiltrating stage," the diagnostic points become more marked.

The induration of the lobe primarily involved has become more evident, and it has probably spread from its early position in a single lobe, either to a neighboring lobe or to the soft parts covering the lobe, and in this way changes will have been brought about in the skin, which are all equally characteristic, and differ only in the degree in which the skin with its subcutaneous tissues is involved. I have been in the habit of describing these changes, as will have been observed by the reader in perusing some of the preceding chapters, under three headings, namely, "Dimpling," "Puckering," and "Infiltration" of the skin, and I believe that this division tends to clearness.

Dimpling of the skin means more or less depression or cupping of the skin covering the infiltrated lobe, brought about by the contraction of the suspensory ligaments of the breast (Plate I., Fig. 1), which pass from the normal capsule of the gland to the skin itself. Where only a few of the ligaments of the gland are involved, the dimpling or cupping of the skin will be limited; where the ligaments involved are numerous, the area of skin depression will be extensive. This condition is well seen in Plate III., Fig. 1. The skin at this stage can, however, be rolled over the growth beneath, or raised from it. This symptom is never present in any connective-tissue tumor of the breast, nor in an inflammatory affection.

The *puckering* of the skin is a later stage than that described, for in it the skin is closely drawn down to the growth beneath, and has practically become a part of it by the process that has been described as local infection. (See Plate II., Fig. 2.)

The suspensory ligaments have contracted to the full, and the skin can no longer be rolled over or raised from the growth. The depression of the skin is now still more marked than it was in the "dimpling" stage, and the surface of the skin presents to the eye a peculiar pitted appearance, which Mr. Banks has aptly described as resembling the pig skin of which a saddle is made. The skin, on manipulation, may feel, to the touch, fairly healthy, or it may seem slightly harder than normal. This condition being suggestive of the next or most diagnostic indication of carcinomatous disease (the stage of local "skin infiltration") in which the skin has become involved by the extension of the disease, by local infection.

In the *infiltrating stage* the skin is not only drawn down and puckered in the ways already described, but it is bound down to the growth beneath, and to the finger feels firm and indurated; the induration being brought about by the infiltration of the skin itself with carcinomatous elements.

The tumor at this advanced stage of the disease seems to be one with the skin; neither in the gland nor in the skin can the surgeon clearly define the boundary of the growth. In fact, it has no definite boundary; for from its central lobular starting place the epithelial elements have spread by infiltration outward in all directions, and drawn all surrounding tissues into its sphere.

In some examples of disease at this stage of trouble the mobility of the tumor will have considerably lessened; what could before have been moved freely with the breast gland upon the extended pectoral muscle, is now somewhat checked in its movements, in some cases to a limited, in others to a marked, degree; the degree of immobility of the tumor and breast gland upon the pectoral muscle below being the exact measure of the amount of infiltration of the deeper tissues, in the same way as the "dimpling," "puckering," and "infiltration" of the skin is an exact measure of the infiltration of the superficial.

To test the mobility of a breast tumor upon the pectoral muscle, it is essential that the muscle should be placed upon the stretch by raising the arm. With the muscle relaxed, a tumor which is perfectly fixed to it may appear movable, the tumor and relaxed muscle moving together. With the muscle extended this fallacy will be avoided.

Retraction of Nipple in Carcinoma of the Breast.—There is no greater fallacy than the very general assumption that retraction of the nipple is an essential symptom of carcinoma of the breast; and no greater error than that with this symptom the diagnosis of cancer is confirmed, and that without it the disease must be of another kind. The truth is that retraction of the nipple is only an accidental symptom of cancer of the breast, met with when the disease is placed near the nipple, but not otherwise; that is, when the disease is so situated that the ducts of the gland are drawn upon by the infiltrating process, and the nipple, as a consequence, is pulled, as it were, toward the infiltrated lobe. When this retraction of the nip-

ple exists associated with a chronic infiltrating tumor of the breast, it is, as a symptom, one of great value; indeed, as great as the dimpling and puckering of the skin over the tumor has been shown to be (Plate II., Fig. 2). By itself the symptom is of no special value, since it may have been a congenital condition, or an acquired one from some antecedent inflammatory or other affection. Again, should the infiltrating lobule be placed at the periphery of the gland, where, by its contraction, the ducts of the gland, as they pass to the nipple, will be but little affected, there will be no retraction of the nipple. Indeed, the nipple may, under these circumstances, be very prominent. The symptom, therefore, is only of value when found in combination with other symptoms; by itself it tells nothing. Again, in some cases the nipple may become retracted during the early stage of the disease, and at a later period become prominent; the disease at an early period of its progress causing traction upon the lactiferous ducts, and at a later period of its course, by steady infiltration, so thickening the gland beneath the nipple, or the nipple itself, as mechanically to lift it out of its umbilical bed and cause it to project. In a third class of cases the nipple may become strangulated at its base by the contraction of the carcinoma, and consequently œdematous, and possibly ulcerated. At a still later stage, from the same cause, the nipple may slough off.

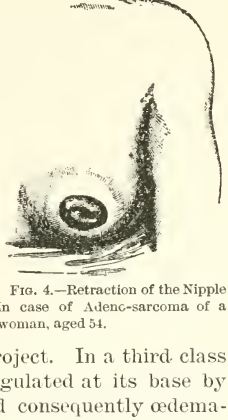


Fig. 4.—Retraction of the Nipple in case of Adeno-sarcoma of a woman, aged 54.

At times a retracting nipple is the first point which draws the attention of the patient to her breasts, and leads to the detection of an early carcinoma.

One of the best examples of retracted nipple I have seen was in a woman past middle life, who had a central tumor of her breast (Fig. 4). The nipple seemed telescopically to be inverted, and to form a depression in the centre of a circumferentially raised fleshy growth. The tumor, when removed, turned out to be an adeno-sarcoma, developed beneath the base of the nipple, in the centre of the breast gland. By

its growth it had steadily made traction upon the ducts of the gland, and as a consequence drawn the nipple as described. Simple tumors, however, rarely cause this retraction. They may, by their growth, flatten a nipple out, or push it into some out-of-the-way place, but they seldom cause its retraction. Where this symptom is present with a benign tumor, it is due either to the central position of the tumor, or to a congenital or acquired condition, such as a former abscess, or local inflammation.

Discharge from the Nipple in Cancer.—In the carcinoma fibrosum of the breast it is by no means common for the patient to complain of any discharge from the nipple. In exceptional cases this symptom may exist, and in some cases before me a serous or blood-stained discharge had preceded the induration of the breast by some months. In one a serous discharge was the earliest symptom; in another a bloody discharge had existed for six months before any tumor was discovered; in a third case a blood-stained clear discharge had existed for 2½ years before a lump was detected; in the fourth case there had been a porter-like discharge from the nipple for four years before a tumor was recognized. In all these cases, when they came under my care, the disease was clearly of the true scirrhous form, and unaccompanied with any marked cystic complication.

In a general way when there is much nipple discharge before any solid neoplasm is discovered, the disease has been cystic in its origin, and carcinomatous or sarcomatous secondarily. These cases will, however, receive attention in Chapter XVI., which is devoted to cystic disease.

In the following cases the growth of the tumor was preceded or accompanied by some discharge from the nipple:

Case I.—Cancer of breast preceded by discharge from nipple.

Jane E., aged 35, the mother of three children, the youngest being eight months old, and all of whom she suckled, came under my care on October 26th, 1867, with induration of her left breast, dimpling of the skin over the breast, retracted nipple for six months, and discharge of blood from the nipple for five months. In January, 1868, the discharge from the nipple had ceased for two weeks, but returned copiously. On

September 3d, 1868, the breast was much larger and harder; the nipple had retracted more; the skin was puckered and infiltrated; no axillary glands were enlarged. Operation was advised, but refused. On July 15th, 1868, the arm was œdematous, and she was sinking.

Case II.—Carcinoma of breast with imperfect nipple, and early discharge from nipple; operation; recovery.

Sarah N., a married woman, aged 40, the mother of four children, all of whom she had suckled with her left breast, but not with her right, as the nipple was imperfect, came to me in August, 1872, with a general infiltration of her right breast, retracted nipple, puckering of the skin over the tumor, and enlarged lymphatic axillary glands. This disease had been coming on for four months, and attention was first drawn to it by the discharge of a curdy material from the nipple, which could be increased by pressure. The breast was removed and recovery followed. The tumor was of the scirrhous kind, with cystic elements.

Case III.—Carcinoma of breast; bloody discharge from nipple; operation; well four years later.

Mrs. G., aged 60, no children, for $2\frac{1}{4}$ years had blood-stained discharge from the nipple and some hardness of the left breast; the discharge could be increased by pressure. January 28th, left mammary gland, nipple, and axillary lymphatic gland infiltrated with carcinoma. All were removed, and patient convalesced. The tumor was of the common scirrhous kind. Four years later this patient was well.

Case IV.—Scirrhous carcinoma of the breast, associated with discharge of porter-like fluid from a retracted nipple, and followed by tuberculation of the skin and enlarged axillary glands; excision of growth with glands; return of disease in skin and opposite breast; patient was alive four years after operation, or eight years after its first appearance.

Mrs. W., a childless married woman, aged 46, came under my care in May, 1875, with her left breast and skin covering it wholly infiltrated with carcinomatous material, and enlarged axillary lymphatic glands. The disease had been slowly coming for four years, and had commenced as a glandular induration and some retraction of the nipple, the nipple soon discharging freely some porter-like fluid. I excised the breast with the skin over it, and the axillary glands, and a good con-

valescence followed. Three years later some few tubercles appeared about the scar, and these slowly multiplied. In January, 1882, the opposite breast became involved, but the patient's health was good. I then lost sight of her. The disease had existed for eight years when I last saw her, and the breast had been removed four years previously.

Lymphatic Infection.—As soon as the skin has become involved, or the tumor has become fixed to the deeper parts, another stage of the disease has to be noted, with probably another starting point; for about this time the glands associated with the tumor by their lymphatic ducts may be expected to become enlarged, and consequently infiltrated. Indeed, "lymphatic infection" may be expected to show itself as soon as it is clear that the disease has spread from its primary starting point, in whatever part of the breast that point may be, and invaded the connective tissue outside the gland, as evidenced by skin dimpling or infiltration; this stage of the disease according with its entrance into the lymph spaces of the glands, such being the true radicles of the lymphatic vessels. When the glands are perceptible to the surgeon's fingers, this lymphatic infection has evidently advanced far, for in ordinary and not very thin subjects there may be some enlargement of the lymphatic glands of the axilla, or beneath the pectoral muscle, without the fingers of the surgeon being able to detect them. Surgeons are now familiar with the fact that, in an operation, enlarged axillary glands are frequently found where beforehand they were not expected. In very thin people the diagnosis of their presence or absence may with some accuracy be determined. In fat subjects this cannot be said to be the case. To make out the true condition of the glands, they must be searched for by an incision through the skin and fascia. To conclude that they are not enlarged because they are not felt through the integument would generally be an error.

The lymphatic glands in connection with a carcinomatous tumor may, however, occasionally enlarge, and later on diminish and even assume their normal dimensions, just as they are known to do as a result of some inflammatory action of the part with which they are connected. I have seen this occur in carcinomatous breast cases on two very distinct occasions, and do not doubt the fact; and such a condition is by no means

uncommon in other regions, such, for example, as the glands under the jaw in epithelioma of the tongue, or of the groin in penile cancer. The explanation can only be that there was associated with the carcinoma some temporary irritative cause, which gave rise to the lymphatic swelling, which subsided with the cause.

In one case which made a lasting impression upon me, the patient, aged thirty-four, the daughter of a surgeon, had true scirrhus of the breast of two years' standing, without evidence of lymphatic complications. The lady was very thin, consequently her axilla was easily explored. I advised early operation in the case, and during the waiting period the glands suddenly became tender and markedly visible. Her father, under those circumstances, regarded the removal of the breast and glands as unjustifiable, and so let things drift. In two months, under the influence of belladonna and glycerin as a local application, the glands steadily subsided, and when I saw her again they were not to be detected. I then excised the breast, laid bare the axilla to search for glands, which were not found, and the case did well. The patient survived the operation five years, and died from some internal disease, the nature of which was never made out by a *post-mortem*. It was believed to have been liver disease; probably it was carcinoma.

The second case was in a single lady, aged 36, from whom I removed a carcinomatous breast, and some enlarged axillary glands, in 1864. She recovered rapidly after the operation, and remained well for three or four months, when she was brought to me by her medical man for a swelling in the affected axilla, which had been detected about a week. The swelling was clearly glandular, nodular, and the size of a walnut. In three months, when I saw her again, the swelling had decreased under the use of belladonna and glycerin, and a few months later it had disappeared. The lady lived six or seven years longer, and died from some acute lung affection.

As the axillary or other glands enlarge, new symptoms and conditions show themselves; for the enlarged glands must be regarded as fresh centres of disease, which progress precisely in the same lines as the original affection. They increase in size locally, and infect neighboring tissues by infiltration. The lymphatics that pass to and from the glands

become direct channels of communication of the disease, unless they themselves become choked and their walls infiltrated, and thus cease to be tubes. They feel, under these circumstances, as solid cords, and may often be traced in the skin as white tubes, thickened and nodulated (Plate II., Fig. 5). As the glands enlarge, the veins of the axilla, or above the clavicle, become pressed upon, and the venous circulation of the arm of the affected side, and of the side and shoulder, becomes interfered with. Under these circumstances, a more or less rapidly occurring œdema of the part involved is a new symptom. The swelling may be either slow in its formation, or very rapid, this point turning upon the suddenness and completeness of the venous obstruction, and upon the size and position of the vein obstructed. Should the vein be one of small size, the œdema will be limited; should it be the axillary vein itself the œdema will be general and rapid. The arm will enlarge and become congested, according to the extent of vein pressure; at times, from congestion, it may be mottled or purple; in other cases there may even be local static gangrene.

Very often, however, the œdema, which may have set in suddenly, steadily subsides under treatment, by elevation, gentle pressure, and friction directed upward; and when this takes place, it is because the vein has either re-opened, or the blood has found other channels through which it can return to the heart. This improvement is, however, rarely lasting. With obstruction to the veins of the axilla, there is generally pressure upon some of the nerve trunks of the brachial plexus, and as a result pain is produced. The seat of pain is determined by the nerve trunks that are pressed upon; in some of these cases it is severe and most distressing; too often it is of a hopeless character, since there is but little prospect of its being relieved by anything less than the death of the sufferer.

Tuberculation of the Skin (Plate II., Fig. 8).—If there be one symptom more typical of cancer of the breast than another, it is the "shot-like" tubercular infiltration of the skin, which is met with in certain cases of the disease. When this condition is present, there can be no doubt as to the nature of the affection, for in no other disease than carcinoma is the skin ever the seat of deposits, which may be so small as only to be perceptible to the finger when passed gently over its surface, or so perceptible and palpable to the surgeon's eye and hand

as to show up as small wax drop-like infiltrations of the skin over the deep tumor, as well as over the surrounding parts. In some cases this shot-like infiltration is very local, in others it is more general. In some the skin appears to the eye mottled irregularly red, and to the finger it is irregularly indurated. In other cases the mottling and infiltration are general, and the skin feels universally indurated. Two or three tubercles in the skin associated with a chronic infiltration of a lobe or lobules of a breast, are, however, as typical of a local cancer as a large number.

In exceptional cases these tubercles appear as bloodless indurations of the skin, and then disappear (see case, page 151); a withering atrophic change, apparently due to contraction of the fibrous elements of the growth, so chokes or destroys what little cell structure may have existed in its alveoli, as to be followed by atrophy; the atrophy in some cases shows itself by a steady disappearance of the tubercles, while in others the tubercles crumble away and disappear. During this wasting process there is, however, usually a developing one; and while, on the one hand, tubercles disappear, others show themselves, so that on the whole the disease usually advances. In a third class of cases, again, the tubercular infiltration of the integument may be an acute condition which shows itself in this form from the first, or as a sudden outburst of development accompanying a chronic carcinoma. When these tubercles appear in the skin, the surgeon may fairly assume that they exist in other tissues surrounding the local tumor, and their existence is to be accepted as evidence of local dissemination of the disease.

The Brawny Infiltration and Tuberculation of the Skin.—The tuberculated condition of skin which has been just described is generally met with in the course of development of the chronic fibrous form of carcinoma or scirrhus; but the same condition is met with in that variety of acute carcinoma which may well be described as the brawny. It shows itself either as a rapidly disseminating tubercular affection of the skin, or as an acute œdematous or brawny infiltration (Plate IV., Fig. 3). Under both circumstances the skin trouble is secondary to the infiltration of the breast beneath, although in certain cases the glandular and cutaneous infiltration seem in point of time to coincide.

In the majority of these cases, however, the patient will describe a lump as having existed in the breast for some weeks, when suddenly the skin over it became red and mottled. If seen by the surgeon at this time, the redness may be that of inflammation, for which I have known it more than once mistaken, and with the redness there may be local increase of heat, a symptom which helps the error. The surgeon must not, however, be misled by these appearances and conditions, for he will, on passing his finger over the red and heated skin surface, at once make out that the skin has lost its softness and smoothness, and feels irregularly indurated; he will, moreover, not be able to raise the skin from the tumor, or, indeed, to separate it from the tissues beneath; the skin and tumor appearing as one. At times the surgeon will be surprised to see interspersed upon this red and heated surface irregular spaces of apparently healthy skin, a condition which by itself should be enough to suggest that the symptoms are not due to inflammation, since with inflammation no such spaces would exist. The fact, however, that to the touch this reddened skin is indurated and evidently infiltrated is sufficient evidence to decide the diagnosis in favor of acute cancerous infiltration. One of the most typical cases of this kind that I have seen was in a woman who was induced to put a hot fig poultice to a tumor in her breast, which had existed for some weeks. The poultice was applied and kept in position for a day, and on its removal I saw the woman. The skin of the breast was then, over an area exactly corresponding to that which had been covered by the hot fig poultice, red and apparently inflamed; to the finger it felt brawny. I suspected at the time that this condition was due to acute cancerous infiltration of the part, and the progress of the case proved the suspicion to be true; for the redness never subsided, and in one week the tuberculation of the skin was marked and characteristic. The case was clearly one of acute cancer, and I believe the local hot poultice hastened its growth.

The acute œdematous infiltration of the skin and breast is met with occasionally, and it is without doubt the most acute and fatal form of cancer found in the breast. It may attack the gland much in the same way as the acute tuberculated form which has just been described, but it may do so more insidiously, or rather less actively, and appears more as

a rapid œdema of the breast and skin over it, with or without retraction of the nipple, the whole gland and integuments covering it feeling to the hand infiltrated, and perhaps pitting on pressure. There may be no external redness or heat suggestive of inflammation, but only œdema, and this œdematous infiltration will probably be confined to the soft parts over the breast. In exceptional cases it will extend to a wider area. Such cases as these, like the last described, have been mistaken for inflammation, but a knowledge of the probability of this affection being cancerous should prevent such a mistake from being made.

With this brawny infiltration of the breast and skin over it, there is an allied condition which claims description, and I have been in the habit of describing it at the bedside as one of lymphatic absorption, in which the lymphatics of the skin of the breast appear as swollen white cords radiating from the nipple, with the intermediate skin slightly thickened from œdema, but not sufficiently so to pit (Plate II., Fig. 5). These local symptoms are always associated with rapidly progressing disease, in which the original nidus not only spreads rapidly by infiltration, or "local infection," but also by "lymphatic infection," the lymphatics, as described, being apparently filled, if not choked, with the epithelial material which it is conveying to the lymphatic glands.

This form of carcinoma in its clinical features is not recognized as it should be. I quote, therefore, some few examples to illustrate its different points. It is to be observed that this variety of carcinoma attacks what appear to be healthy women; indeed, many have a florid aspect of health. It spreads rapidly and kills quickly. Thus, in some of the cases quoted, the disease ran its course in five months. When complicated with pregnancy or lactation the disease is most active.

In the way of treatment little can be done. When I have been tempted to operate I have often regretted doing so. In a general way it is best to leave the disease alone.

Case I.—Acute brawny carcinoma of the breast in an apparently healthy woman, commencing as an erythema with œdema three months previously; death in less than five months from the first onset of the disease.

Miss B., aged 47, a healthy-looking woman, came to me in

April, 1871, with a breast which was œdematous and brawny, and with the skin over it full of flattened carcinomatous tubercles. The disease had appeared three months previously as a swelling of the gland, and great redness with œdema of the skin, over the gland. The redness soon subsided, but the swelling remained and became harder. The disease spread rapidly to the parts around, and the patient died in June, 1871, exhausted from probably internal disease.

Case II.—Acute brawny carcinomatous infiltration of breast and skin; death in five months from discovery of disease.

Eliza B., aged 43, a healthy-looking single woman, came under my care December 13th, 1869, with acute disease of her right breast, existing only two months. The whole gland was infiltrated, and the skin over it like brawn. The nipple was depressed, and lost in the surrounding elevation of the breast; the axillary with the supraclavicular glands were enlarged. On February 17th the arm was œdematous. On March 3d the woman was sinking.

Case III.—Acute brawny carcinomatous infiltration of breast and skin over it; death in six months.

Ann R., aged 53, a married woman, the mother of eleven children, the youngest being 12, came under my care on June 1st, 1857, with an acute brawny infiltration of her right breast and skin over it, and œdema of the right arm. She had been perfectly well up to three months before, when she noticed a swelling in her breast, which rapidly increased and became complicated with pain down the right arm, and swelling. When seen, the axillary and supraclavicular glands were much enlarged; the breast was like brawn, and the skin over it was evidently infiltrated with new elements, and œdematous. In one month all the symptoms were worse, and the skin became the seat of acute infiltration of cancerous tubercles. Cough also had appeared. On September 15th, that is within six months of the first appearance of her trouble, she died with internal cancer from exhaustion.

Case IV.—Acute brawny cancer of both breasts, proving fatal in nine months.

Ann W., aged 49, the mother of six children, all of which she suckled, came under my care on January 26th, 1865, with an enormously swollen, œdematous, and indurated left breast,

of eight weeks' standing. There was pain in the part, which was worse at night, and there was at times increase of heat in the gland. The axillary glands were uninvolved, the integument over the breast was œdematous, and pitted on pressure. In the course of three months the axillary glands became enlarged. The œdematous integument over the breast became as hard as brawn, and ceased to pit; it often also became red as if inflamed. Three months later the arm became involved by extension of the brawny infiltration, and the right breast became similarly implicated, the disease in the right gland passing through all the same stages as it had done in the left; the right arm also became swollen. The patient lived nine months after the discovery of the tumor, and died from asthenia, with probably internal cancer.

Case V.—Brawny carcinoma of breast; excision of gland; rapid death of patient from internal disease fourteen months after discovery of the tumor.

Eliza B., aged 32, a by no means unhealthy-looking single woman, came under my care on January 7th, 1870, with a tumor in her right breast of eleven months' standing. It had grown slowly up to a month ago, when it spread rapidly. At present the whole gland is generally infiltrated, although movable upon the pectoral muscle. The skin over it is like brawn; the nipple is retracted; the axillary glands are not to be felt. The tumor and skin over it were excised, and a good convalescence followed, but the woman died April, 1870, from internal cancer.

Case VI.—Acute brawny carcinomatous infiltration, attacking breast damaged by suppuration; death in fifteen months.

Mary L., aged 36 (suckled five children, youngest nine months old), 3½ years ago had abscess in her left breast, but has been able to suckle with it since. January 7th, 1869. Three days after her last confinement, nine months ago, she had abscess in the breast, which opened in many ways; sinuses discharged for seven weeks, and then closed, after which a lump appeared in the breast, which has rapidly increased. At present the left gland is generally infiltrated, and the skin over it is like brawn, and full of tubercles; axillary glands enlarged; nipple drawn in. Six months later powers rapidly failing.

Case VII.—Acute brawny carcinoma of breast in a pregnant woman, following abscess in the breast three years before.

A woman, seven months pregnant, aged 36, came under my care in February, 1886, with an acute brawny infiltration of her left breast and tuberculation of the skin over it. It had commenced as a lump seven months ago, with her pregnancy, and has steadily increased. The lump had appeared at the seat of an abscess she had three years before.

Case VIII.—Acute brawny cancer of one breast, with lymphatic infection, and a local cancer in the other.

Harriet F., aged 28, a married woman, with one child four years old, which she had suckled with the left breast alone, came under my care in December, 1885, with an enlargement of her left breast, which had been coming for ten months, after a blow. The lump grew steadily, and was the seat of a sharp pain. Four months after its appearance the nipple began to retract. A month before she came to see me she poulticed the left breast; and after this the skin, which was white previously, became red. Two weeks previously she observed a lump in her right breast. When seen, the left breast was twice its natural size; the skin over it appeared to the eye red, and to be the seat of innumerable tubercles, varying in size from millet seeds to a threepenny-piece. The whole gland was hard, and the skin over it brawny and fixed to the parts beneath; the nipple was retracted. The lymphatic glands in the axilla and above the clavicle were enlarged. In the axillary lobe of the opposite breast there was a nodule of carcinoma the size of a walnut infiltrating one of the lobes. In the skin over the sternum there were likewise tubercles. No surgical relief could be suggested.

Case IX.—Brawny cancer of both breasts; death in twenty months from onset of disease.

Mrs. A. D., aged 41, the mother of five children born dead, consulted me on November 7th, 1869, with both breasts generally infiltrated with cancerous disease, and the skin over them brawny and tuberculated; both glands were fixed to the chest, and the axillary glands were enlarged. The disease of the right gland had been coming for fifteen, and that of the left for seven months. The left breast was ulcerating, this process having commenced in the nipple. The woman looked well; within six months she died with lung trouble.

Case X.—Acute cancer of breast, with lymphatic infiltration of skin; excision; convalescence.

Fanny A., aged 35, came under my care on October 27th, 1883, with a tumor in her left breast. She had had one child eleven years ago, and suckled, though with sore nipples. Three months before admission she discovered a lump in the centre of her left breast, the size of a bantam's egg; this had steadily increased. When seen, the whole breast seemed to be generally enlarged; the nipple was retracted; and the skin over the tumor showed white lines radiating from the nipple; these lines, which felt by the finger like hard cords, were clearly lymphatics. The skin was slightly œdematous; no axillary glands felt. On November 5th the breast was removed and the axilla explored, some glands being found. The patient did well. The tumor was clearly carcinomatous, but of the softer kind. The skin was evidently infiltrated, and the lymphatics in it choked with cell elements. The external view of this condition is well seen in Plate IV., Fig. 1. I am unable to trace the subsequent course of this case.

Case XI.—Acute brawny carcinoma in a woman, aged 71, following a blow.

Charlotte M., aged 71, came under my care, July, 1884, with an acute carcinomatous infiltration of her right breast, with lymphatic infection of the breast and tuberculation of the skin over the tumor. All these symptoms had appeared within one month, and had followed the appearance of a lump in the breast, which had made its appearance five months after a severe blow upon the part.

Case XII.—Brawny carcinoma of left breast in a woman aged 75.

Laura D., a widow, aged 75, came under my care in December, 1872, with a hard, tuberous, carcinomatous growth in her left breast, which had commenced six months previously as a small lump the size of a plum, and had steadily increased. When seen, the tumor was the size of a fist, and occupied the whole gland. It was very hard, and felt as if made up of several distinct tumors. The skin over the tumors was œdematous, and felt like brawn. The nipple was retracted and the axillary glands were enlarged.

Case XIII.—Carcinoma in an ill-developed breast, which had been damaged by an abscess; lymphatics infiltrated, and skin tuberculated; operation; death within a year.

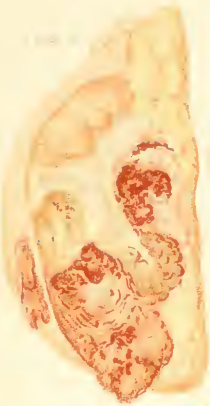
Eliza B., aged 62, the mother of three children, all of whom she suckled with the right, but not with the left breast, as it was not fully developed. During the second lactation an abscess appeared in the left breast. One year before she consulted me, on November 23d, 1879, she noticed a small lump in the left breast. This increased slowly up to four months ago, when it became painful. When seen, the whole left breast was infiltrated with some neoplasm; the skin over it was adherent; and radiating from the nipple, the lymphatics in the skin appeared as hard, white, radiating lines. There were also in the skin many pink tubercles. The nipple was retracted; the breast itself was nodular and hard; the axillary glands were apparently unenlarged. November 28th: Breast removed and axilla explored, some enlarged glands being removed. The patient did well. Temperature after operation never ran above 100°. A section of the growth showed a perfect specimen of carcinoma of the softer variety, which had involved the skin generally. The white radiating lines were clearly lymphatics infiltrated with cancer elements. The patient did well after the operation, but died within twelve months from a return of the local disease and chest complications.

Case XIV.—Acute tubercular carcinoma affecting breast, with depressed nipple; death in fourteen months.

Ann G., aged 46, the mother of twelve children, the youngest being one year old (she never suckled with her right breast, as the nipple was retracted), came under my care January 2d, 1868, with acute carcinomatous infiltration of her right breast, with nodular skin tubercles over the gland, and enlargement of the axillary glands. The disease had commenced ten months previously. On May 8th, fourteen months after the discovery of the tumor, she sank.

Case XV.—Acute tubercular carcinoma of both breasts and integument of the chest and abdomen; ulceration of left breast.

Harriet L., aged 45, a married, childless woman, came under my care in July, 1879, with a cancerous infiltration of both breasts, also of skin over the breasts, and covering the sternum, chest, and abdomen. The skin looked red, and felt hard, nodular, and fixed to the parts beneath. Both nipples were retracted, and the axillary glands on both sides enlarged. The



disease had commenced two and a half years previously as a small hard lump behind the nipple of the left breast, which had appeared two months after a blow upon the part. Two months later the nipple retracted, and the tumor spread. Eight months ago the skin became discolored and lost its softness, and about this time a lump was noticed on the opposite breast. Three months ago the skin over the left breast ulcerated, and there has since been discharge. Four months ago she had pain in both axillæ, and two months later œdema of the left arm. Her general health was good, and she had no ill aspect. Nothing could be done.

Ulceration of a Cancerous Tumor.—In an early page of this work it was pointed out that cancerous tumors, like other neoplasms, are shorter lived than the normal tissues in which they are placed, and that they will to a certainty, in the course of their progress, undergo degenerative changes, if not death. Under such circumstances any carcinomatous tumor, or, indeed, any tumor of the breast, cancerous or otherwise, will sooner or later break down either in its centre or on its surface, and give rise in the latter case to a cancerous ulcer (Fig. 5), or in the former case, to a cancerous cavity, which discharges from its centre after the manner of an abscess (Plate II., Fig. 6).

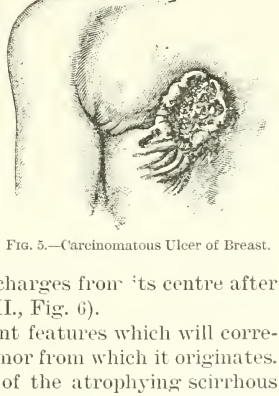


Fig. 5.—Carcinomatous Ulcer of Breast.

The cancerous ulcer will present features which will correspond to the form of cancerous tumor from which it originates. Should it follow the degeneration of the atrophying scirrhous variety described in class 1, the ulcer will be of the most indolent kind, and appear simply as a surface deprived of its upper layer of epithelial elements, and discharging hardly more than the crumbling débris of a withering tumor. This variety of ulcer may, indeed, dry up, but it can hardly be described as healing (Plate III., Figs. 5 and 6).

Should it be consecutive to the breaking down of the more

common variety of carcinoma fibrosum (class 2), the ulcer will be typical of what is known as a cancerous ulcer (Fig. 5); that is, it will present an irregular surface, discharging serous fluid containing the débris of degenerating and breaking down epithelial tissue, with raised, thickened, infiltrated, and everted edges, which are so unlike the edges of any ulcer the result of inflammation, as to forbid an error in diagnosis being made. The process of degeneration which originated the cancerous ulcer steadily continues, and consequently the ulcerating process spreads; for a cancerous ulcer rarely heals; it is almost always a spreading one, and continues until the patient is exhausted. Cancerous ulcers do not fungate; fungating growths are usually sarcomatous.

When the degenerating or dying process commences in the centre of a cancerous growth (as it does when the disease is more of the tuberous than of the infiltrating variety of cancer, as described in class 3), the ulcerating skin process will be consecutive to the formation of what clinically might have simulated an abscess; since it would have commenced as a softening process of the centre of the dead and dying neoplasm, and continued as an extension of the process through all the parts which covered in the cavity, till the tissues outside gave way and permitted the escape of the cavity's contents.

The material that escapes from the cavity would be dead tissue mixed with the fluids of the dying parts; the walls of the cavity would be degenerating cancer; the edges of the opening through which the dead tissue escaped would likewise be cancerous, for they would appear as thick, raised, elevated, infiltrated, pouting, everted lips, from between which a thin, ichorous, and probably fœtid discharge would escape, the discharge consisting of the débris of dead and dying tissue.

When the skin is tuberculated in any of the ways previously described, there may be ulceration, the tubercles to a certainty eventually undergoing degenerative changes and breaking down. Under these circumstances there may be many ulcers, but each will have its own special character, which will correspond to one or other of those which have been described. In the brawny form of cancerous infiltration the ulceration may be extensive, the breaking-down process generally commencing in the skin tubercles and spreading to the deeper parts. This process is rapidly exhausting, and soon terminates life.

In exceptional cases the whole or part of a tumor may die outright, and then slough off. This result happens at times when the tumor becomes the seat of an inflammation, and particularly of erysipelas.

By way of summary, I quote a paragraph from Gross's excellent work on mammary tumors, not that I can indorse from an analysis of my own cases his carefully worked-out and definite averages, for my own cases do not give me with sufficient accuracy the necessary data, but because upon the whole I believe his deductions to be practically valuable:

"From the preceding facts we learn that carcinoma evinces a remarkable disposition to infect the adjacent tissues, and that it progresses at first toward the surface. The skin is invaded in 68.9 per cent, deep attachments ensue in 21.9 per cent, and the opposite breast suffers in 3.6 per cent of all instances. The occurrence of local dissemination is, moreover, indicated by the formation of circumscribed nodules in the skin in 10.6 per cent; in the subcutaneous connective tissue in 8.39 per cent; in both these situations, as in the cuirass form of cancer, in 1.95 per cent; in the pectoral muscles in 7 per cent; in the intercostal muscles in 1.35 per cent; and, finally, in the ribs in 2.8 per cent.

"In the order of the date of these appearances, we may look for extension to the superficial fasciæ and skin in 14 months, for ulceration in 20 months, for fixation to the chest in 22 months, and for invasion of the second breast in 32 months."

Clinical Features of a Medullary (tuberculous) Carcinoma (Plate II., Fig. 4; Plate II., Fig. 6; Plate III., Fig. 4).—In this form of carcinoma the cell element predominates largely over the fibrous, and there is no tendency to such contraction of the growth as is well known takes place in the scirrhous variety. The tumor consequently grows more rapidly, assumes a more lobulated outline, is softer to the touch, as well as more elastic and semi-fluctuating than scirrhus. In it also the nipple is flattened out, not retracted. The tumor may grow to a great size in a few months. The last example I saw was the size of a cocoanut. As the tumor grows the skin becomes stretched, and full blue veins become very conspicuous on its surface; later on the skin becomes adherent to the tumor by infiltration; it may even assume a red and inflamed

appearance, the redness being really due to acute infiltration. To the finger the skin will feel, as previously described, œdematous or brawny. At a still later stage ulceration will occur.

Before this stage has been reached, indeed probably before the skin has become fixed to the neoplasm, the axillary or clavicular glands will have enlarged; when this lymphatic infection has taken place the disease goes on rapidly. This soft form of carcinoma, like the scirrhus, is an infiltrating affection; it is rarely if ever encapsuled; it differs from the scirrhus form more in its mode of growth than anything else. At times the cell growth increases so rapidly that it forms a mass, which, being imbedded in the mammary gland, has a circumscribed appearance, suggestive of being encapsuled. In other cases the disease may develop within a cyst, and so really be encysted. In such cases the presence of other cysts will explain its appearance. It has, however, doubtless often been mixed up with sarcoma, and I am convinced that I, in common with others, have fallen into this error. Cases which have passed under my care during the last ten years or more, which I should formerly have described as examples of medullary carcinoma, I have called adeno-sarcomata; and I may say that I have not seen for many years, until quite recently, a good example of this affection. On looking into the literature of the subject, the above conclusion became very evident, and cases have been described of this affection which would have been better called acute carcinoma or rapidly growing sarcoma. For in carcinomatous, as in sarcomatous, tumors, there is great variety, and this variety is determined in both classes by the relative proportion of the fibrous and cell elements. When the fibrous element predominates, a scirrhous tumor is said to exist if the neoplasm be of the carcinomatous type; whereas if the cell element predominates, it will approach the character of what has been described as medullary carcinoma.

Under these circumstances it would probably be wise if the term encephaloid variety of carcinoma was abolished, for clinical experience tells us that in the long chain of varieties which forms the carcinomatous group of tumors, there may be innumerable degrees as to density and cell growth.

Clinical Features of a Colloid Carcinoma.—This is probably always a degenerative change of a carcinomatous tumor,

although in exceptional cases the colloid change is such an early feature of the disease as to suggest that it may be a primary growth.

It is found mostly in women after 40, as is carcinoma, but it may be met with in younger as well as in older subjects. It is rarely an acute affection; indeed, it seems to be of slower growth than the majority of cases of scirrhus. It begins as a lumpy swelling in a lobe of the breast, not as a simple induration as in scirrhus, which steadily increases. At first its growth may be slow; later on it becomes rapid. The outline of the tumor is usually bossy. The disease is generally preceded by nipple discharge, and this discharge is usually sanious (Plate III., Figs. 7 and 8).

There is at times retraction of the nipple, but this symptom is not constant. To the finger it feels firm but elastic, and the bosses upon the tumor are suggestive of cysts. The discharge from the nipple supports this view. In the course of its progress the skin will become adherent, and later on ulcerated; through the ulcerated openings the gelatinous or colloid fluid will ooze. The edges of the ulcerated opening are not infiltrated as in carcinoma, but more resemble the sharply-cut edges of the cystic sarcomatous growth.

Cases have been recorded of colloid carcinoma in which the skin has become tuberculated and the tumor fixed to the pectoral muscle. I have not seen those symptoms associated with it.

In the fifth volume of the Pathological Society's Transactions, a case of the late Sir W. Fergusson is recorded, in which recurrence after removal took place on at least two occasions. The patient was originally under Mr. B. Travers's care in 1845, when the breast was removed. Three years later a tumor was taken away from the cicatrix; and five years later again Sir W. Fergusson excised several tubercles from the same part. The disease had therefore existed for eight years, and then seemed to be local. The patient was at last operation aged 38.

The disease may spread by lymphatic infection, though this rarely takes place till a late period of the case; indeed, the disease may have existed for some three, six, or more years before this symptom appears. In a case of my own the disease had existed for seven years, and it was then quite local.

In brief, colloid carcinoma is a slow-growing tumor, and the least malignant variety of carcinoma; it approaches, in fact, more the benign than the malignant growth. It is, however, difficult to diagnose before the degenerating or ulcerating stage has been reached, when the discharge of the glutinous, colored, white-of-egg-like material from the ruptured cavity, and the well-defined uninfiltrated edge of the open wound clearly reveal its true nature. In its early state it never has the hardness of a scirrhous carcinoma, nor the roundness of an ordinary sarcoma, as seen by the drawing (Plate III., Fig. 7); it has a bossy outline, more like an adeno-sarcoma or cystic sarcoma than anything else, and for the latter it is the most likely to be mistaken. I have seen but two examples of this affection, the one I now give an abstract of, and a second very similar to it in a woman, aged 56, who refused operation, and of whose future history I cannot learn anything.

Case I.—Colloid disease of the breast of seven years' growth; removal of gland; seven years later carcinoma of the nipple of the opposite breast, following a local eczema; no return of colloid disease.

Charlotte J., aged 65, a healthy, married, childless woman, came under my care on April 2d, 1873, with a tumor in her right breast. The disease was first observed seven years before as two small lumps close to the nipple; a year later these lumps, which had not increased much in size, had changed color. Since then the tumor has slowly and painlessly increased. Six months ago, when the tumor began to grow rapidly, pain appeared; and three months later the tumor burst and discharged a thick blood-stained fluid, which has continued ever since. On admission the tumor has a livid appearance, and measures six inches in diameter (Plate III., Fig. 7). It is clearly lobulated, and each lobule fluctuates. The opening into one of the lobules is clean cut, and from it flows a thick glairy jelly-like colored fluid. On April 8th the tumor was excised, and a good recovery followed.

On making a section of the growth its lobular nature was very marked. Each lobule was made up of a colored jelly-like material, this caseating in parts. Under the microscope, in the fresh state, it showed a delicate stroma of connective tis-

sue forming loculi, in which large granulation-like cells were found (Plate III., Fig. 8). The patient remained well for more than seven years, when so-called eczema attacked the nipple with its areola of the opposite breast, and as this did not heal after six months' treatment she came to me. I then found, May 4th, 1881, a typical example of Paget's disease of the nipple, the base of which was indurated, and the nipple retracted. The lymphatic glands were not enlarged. The cicatrix of the operation upon the opposite breast was quite healthy. The woman at this time was 73, so no operation was suggested.

I am able to report that this woman was alive and in good health in 1886; that the local carcinoma had but slightly increased; and that there was no return of her colloid disease.

In this case, therefore, a colloid carcinoma, which had existed for seven years before it was removed, showed no signs of return thirteen years later. It will be interesting to observe whether the carcinoma of her left breast, from which she is now suffering, will undergo a colloid transformation.

CHAPTER XIV.

TREATMENT OF CARCINOMA OF THE BREAST.

If the view of carcinoma taken in the previous pages be correct, and the disease is to be regarded primarily as a local one, there can be no question as to the principle of practice which should be followed in its treatment, and that that principle can be summed up in the one word, removal; meaning by that word the entire removal and complete extirpation of the local affection. This practice is based upon the conviction that if the smallest particle of diseased tissue be left behind, what remains will continue to grow; and that the partial removal of a carcinomatous growth tends to induce injurious changes in, as well as a more rapid growth of, what is left, whether that remnant be left in the seat of the original growth, or in the lymphatics which pass from it.

Charles Moore, of the Middlesex Hospital, saw this so long ago as 1867, and in a valuable paper, "On the Influence of Inadequate Operations upon the Theory of Cancer,"[32] laid it down as a law that "the one important point, both for practice and theory, is to remove the whole. The least remnant is capable of growth, and may spring up into a new tumor with all the energy of the first." "When any texture adjoining the breast is involved in or even approached by the disease, that texture should be removed with the breast. This observation relates especially to the skin, to lymphatics, to much fat, and to the pectoral muscle. The attempt to save skin which is in any degree unsound is of all errors, perhaps, the most pernicious, and whenever its condition is doubtful that texture should be taken away. A broad scar, and the stretching and compression due to its subsequent contraction, appear to be especially satisfactory. In the performance of the operation it is desirable to avoid, not only cutting into the tumor, but also seeing it. No actual morbid texture should be exposed, lest the active microscopic elements in it be set

free and lodge in the wound. Diseased axillary glands should be taken away by the same dissection as the breast itself, without dividing the intervening lymphatics, and the practice of first roughly excising the central mass of the breast, and afterward removing successive portions which may be of doubtful soundness, should be abandoned." These remarks of Mr. Moore's had reference rather to the practice of the day, in which the tumors were removed from the breast, and the nipple with portions of the gland left, rather, than to the general exploration of the axilla for enlarged glands as recently advocated.

Thiersch also laid down the maxim that all operations upon epithelial cancers should be conducted solely with reference to their thorough eradication; that all epithelial cancers should be operated upon if they can be effectually; that a partial operation is, as a rule, a surgical blunder. In more recent times this principle of complete removal of the local disease has been considerably extended, and we find Mr. M. Banks, of Liverpool,[33] Mr. Pearce Gould, of London,[34] with Küster, of Berlin, and others, advocating in no feeble way the routine practice of exploring the axilla of every patient from whom a cancerous breast is to be excised. Küster in support of the practice asserting that at least one-third of his cases treated in this way have remained well for three years, the period which leads Gross to regard as equivalent to a cure.

With the leading thought of complete removal, therefore, engraved on the surgeon's mind, the corollary is clear that the earlier the local disease is taken away the more favórable the result is likely to be; for theoretically it can hardly be doubted that if, on the very first onset of the trouble, the disease could be extirpated, a large number of cures would have to be recorded. If an epithelioma of the skin can be cured by an early removal, surely it is a reasonable hope that a carcinoma (epithelioma) of the breast will likewise be curable if treated in the same way, that is, by an early excision.

Early operation, as well as complete removal, are consequently the two essential points to observe in the treatment of this serious malady, if operative interference is undertaken under any idea of bringing about a cure.

On Early Removal.—When a carcinoma of the breast has so grown as to present features which make the diagnosis

of the disease certain, the trouble has far advanced; it has probably reached the stage already described as that of mature infiltration; for infiltration of the gland of a typical character, with dimpling or puckering of the skin over the gland, and possibly some retraction or dragging of the nipple, are advanced symptoms of breast cancer, and indicate to a certainty that the infiltration of the lobe of the affected gland, which was primarily local, has spread beyond its original sphere so as to affect the coverings of the gland, and more of the gland than the single lobe in which it originated.

A breast thus affected should doubtless, as a rule, be at once wholly removed; but it cannot be denied that the removal of the gland under these circumstances is less likely to be followed by a complete cure, that is, a permanent absence of the disease, than might reasonably be looked for if the breast had been taken away before these well-marked symptoms had put in an appearance.

The removal of the diseased gland under the circumstances described, is, however, far more likely to be followed by a good result, than could be anticipated if lymphatic infection complicated the case, such infection being unquestionable evidence of secondary cancerous extension.

What local symptoms, it may therefore be asked, should be considered of sufficient weight to lead the surgeon to suspect a local cancer; and under what circumstances may this suspicion of a local cancer justify the surgeon in recommending surgical interference?

A satisfactory answer to these questions will be found in the chapter devoted to the consideration of the clinical features of a scirrhous carcinoma (Chapter XIII.); but it may confidently be asserted that it is by the removal of the disease in its early infiltrating state that the best hopes of the surgeon may reasonably rest.

It is not, however, to be supposed that such an operation as excision of the breast gland is to be recommended or carried out, when possibly the clinical symptoms are no more than a local infiltration of a single lobe, and that infiltration has not been proved to be cancerous, for such advice would be wrong; but I would strongly urge upon all surgeons the propriety of making an exploratory incision into any tumor of the breast which seems to be infiltrating, and which may

probably prove a carcinoma, in order that the complete extirpation of the diseased breast may follow, should the incision into the diseased part clear up the doubts which hung about the case, and make the diagnosis of carcinoma certain; while, on the other hand, if the tumor of the breast, into which an incision has been made, turn out to be of a simple character, the means adopted for diagnostic purposes may probably suffice for its enucleation or cure.

The diagnosis of early tumor is uncertain, writes Marcus Beck (Heath's Surgery), and yet if the disease is malignant, the only hope of cure lies in early recognition of its nature. In these cases, therefore, an exploratory incision should always be made. If the tumor is one of the simple growths, its smooth surface will be seen as soon as the capsule is opened, and the mass can be turned out without difficulty. If it is a sarcoma, its soft structure and less perfect outline will be recognized. If it is a cyst or an abscess, the contents escape; and if it is an indurated lobule, its leathery toughness, and perhaps the small retention cysts, will be recognized. If it is a scirrhus the "creaking of the knife as it enters it, and the sensation like cutting an unripe pear, and its sharp hard edge, not separable from the surrounding tissues, clearly show its nature."

"If the case is a very doubtful one, a freezing microtome and a microscope should be at hand, and a section should be mounted from a small slice taken from the growth. In this way all doubts are set at rest. 'Waiting till symptoms develop,' in the case of cancer, means waiting till all hope of cure is gone."

All chronic indurations of the breast in women over forty years of age, not enfeebled from age or infirmity, in which there is absence of evidence of its being inflammatory, should consequently be explored by an incision with the view of the exploratory measure being followed by excision of the breast, should the induration prove to be a carcinomatous infiltration.

Exploratory operations under these circumstances I hold to be of great practical and scientific value, and it would be well if they were always made. It would be far better for a surgeon to make at times an exploratory incision into a breast tumor under an erroneous impression, than to allow a carcinoma in the stage of early infiltration to advance and involve other structures, when we know that it is at this stage of early

infiltration that its complete extirpation is most likely to prove permanently successful.

When enlargement of the lymphatic glands complicates the case of carcinoma of the breast, the disease may still be taken away if the surgeon sees a reasonable possibility of the removal of the affected glands with the primary growth, and the general condition of the patient justifies the attempt. To take away the breast gland and leave the affected lymphatic glands is but a partial measure, since the disease by the operation is only partially removed, and the lymphatic glands which are left behind are likely, after the removal of the breast, to increase rapidly, and become fresh centres from which new troubles may emanate

When, therefore, it is expedient to take away any well-marked carcinoma of the breast, it is a wise practice, in the majority of cases, to lay open the axilla at the same time, and look for enlarged lymphatic glands; since it is now the common experience of surgeons to detect them after an incision, where before none were suspected. I have adopted this practice very generally for about ten years, and have reason to be fairly satisfied with the results. But I have not done so as a blind routine. In thin women in whom an axilla can be well explored digitally, I have not made this incision; nor have I, in certain other cases, particularly in feeble women or in those advanced in life, in whom I felt the extra measure, by its increased severity, might prove detrimental, and more particularly when the axillary manipulation has been efficiently made with the patient under the influence of an anæsthetic, and no enlarged glands were to be felt. The rule of practice ought, however, to be axillary exploration in the majority of cases of excision of the mamma for cancer; the omission of the practice the exception.

When a carcinomatous breast has broken down and is ulcerating, it may be removed if not too firmly fixed to the deeper structures, the disintegrating change in the tumor affording, indeed, an extra argument in favor of operation; and should the primary growth be associated with lymphatic glandular enlargement, and there is no reason why these infiltrated glands should not be taken away on account of their great fixedness or the age or general enfeebled condition of the patient, the surgeon should take them away with the pri-

mary growth, and so work for a cure. But should this complete operation be contra-indicated on account of the size of the tumor relatively to the age or infirmity of the patient (the removal of the breast with the lymphatic glands being, without doubt, a graver measure than the removal of the breast alone), the incomplete operation of the removal of the breast alone may be carried out; this partial measure being undertaken solely as one of expediency, and with the view of removing a local source of distress and weakness, and of making what remains of life more comfortable.

Should the tumor be firmly fixed to the pectoral muscle or deeper parts, and the glands in the axilla be found immovable, or those above the clavicle enlarged, the surgeon had better leave the case alone.

Should the tumor also be very large, and the shock of its removal likely to be severe when the age of the patient or her feebleness is taken into account, non-interference should be the rule of practice; whereas should the tumor be small and movable, and the woman yet old, it may be right and expedient to take it away. An operative measure, which in the middle-aged or comparatively healthy woman would be justifiable, may clearly be the reverse in the aged or enfeebled; and a small tumor may often be taken from a healthy old patient, when a large one in an enfeebled middle-aged woman had better be left alone.

Certain old women, particularly the thin and wiry, bear operations very well, and such may frequently be submitted to surgical treatment which their fatter or feebler sisters would be unable to support.

When carcinoma of the breast is associated with pregnancy, the treatment of the case is, indeed, difficult. To let the disease of the mamma go on with the physiological process of pregnancy, even up to if not through lactation, is to give the disease the best chance of making rapid progress, and to advance beyond surgical interference, and yet to operate during pregnancy is a measure of danger.

The certainty of the evil of delay is, however, greater than the certainty of the evil of action, and I am disposed to think that upon the whole the advantages of action are the greater, and the practice based upon it should be advocated. In the three following cases in which this practice was followed the success was sufficient to justify the means.

This practice is, however, to be followed with extreme caution, and after the fullest consideration of the facts of the individual case.

Case I.—Carcinoma of breast and pregnancy of seven months; excision during pregnancy; natural labor; no return two years later.

Mrs. S., aged 46, the mother of many children, came to me on May 14th, 1879, when she was pregnant seven months, on account of an acute carcinoma of her right breast, which came on with and developed during pregnancy. I excised the breast and the patient did well. She was confined on July 4th; and had a natural labor. There was no return of her disease two years later.

Case II.—Carcinoma mammæ; pregnant seven months; operation during pregnancy; recovery; survived operation two years.

Mrs. S., aged 42, the mother of four children, the youngest being one and a half years, who had not nursed with her right breast from defect of the nipple, came to me on May 10th, 1879, when pregnant seven months, with her right breast infiltrated and nipple ulcerated; no enlargement of axillary glands. The breast was removed and a good recovery followed; she was confined at the full period naturally, and had no breast trouble. She died December 31st, 1881, or two and a half years after the operation, from internal cancer.

Case III.—Carcinoma mammæ; pregnant six months; operation during pregnancy; convalescence; confined at full time; survived operation one year.

Mrs. B., aged 48, the mother of eight children, the youngest being seven years of age; the first two of which she suckled without trouble, and with the later children used her right breast more than the left, consulted me on February 28th, 1876, when six months pregnant, with an infiltrating tumor in her right breast of six months' standing. The whole gland was involved. I excised the breast, and a good recovery followed. She was confined at the full period and the labor was natural. She survived the operation one year.

When the question of operative interference is raised in cases of carcinoma of the breast, the nature of the carcinoma,

the size of the tumor, and the clinical history of every case should be considered. A measure which would, under one set of circumstances, be right, would under another be wrong; and an operation which, in one variety of the disease, would be expedient, in another would be quite the reverse. I propose, therefore, now to consider the question of operation in the different forms of carcinoma to which attention has been drawn.

Operations in the atrophic or withering variety of carcinoma are not to be advocated. Such cases are very slow in their progress, and although slow they are, as a rule, sure. Women with this variety of carcinoma almost always die eventually from internal disease; and it seems that interference with the local disease often helps to cause the rapid growth and increase of secondary deposits, which at the time were not manifest. It is probably true that if the disease were removed at its first stage, that of early infiltration, good results might be obtained, in the same way as it is hoped that by early operation in the ordinary carcinoma fibrosum, like good results would have to be recorded. But, as a rule, patients suffering from this atrophic variety of carcinoma do not seek advice till the disease has existed for years, when in all probability it has ceased to be a local affection, but has become disseminated in some way, and probably by means of tubercles. Under these circumstances, local interference, or the partial removal of the disease, is followed by what may generally be looked for, the rapid development, or rather growth, of whatever secondary deposits may exist, either as lymphatic enlargements, or secondary metastatic, or disseminated tumors.

These are, moreover, the case of carcinoma which live the longest. They are those that, when mixed in statistics, tend to raise the average duration of life to a higher level, and that induce surgeons to believe that non-interference in carcinoma of the breast generally gives a longer life. (See cases reported, page 151.)

Operative interference in the acute or brawny variety of carcinoma is not to be advised. When I have been tempted to remove a breast under these circumstances, I have rarely had any satisfactory result: a speedy return, or rather rapid growth of the disease having been the rule, and a long im-

munity quite an exception. The truth is, in this variety of cancer it is impossible for a surgeon to know the limit of the local affection, if, indeed, it be local; and under these circumstances, when an operation is made, it must be regarded as only a partial or incomplete measure. The brief reports of cases of this variety of carcinoma printed at page 187, will show how acute this trouble is, how rapidly it becomes diffused, and how futile operative interference is likely to be.

Treatment of Carcinoma of both Breasts.—There is no reason why both breasts, when simultaneously affected with carcinoma, should not be taken away, if by doing so the disease can be wholly removed; and there is no reason why the second breast, when so affected, should not be amputated when it has become the seat of carcinoma after the lapse of weeks, months, or years following the removal of its fellow for a like trouble.

The only bar to a double operation at the same time, or with an interval of time, is either the presence of lymphatic, glandular, or secondary deposits, which cannot be taken away; or a feeble general condition of the patient which would be unable to stand the depressing influence of a large operation.

I append some cases of this comparatively rare condition. In several, both breasts were removed at different periods; in others, one only was operated upon, a second operation, for various reasons, not having been performed; in a third class no operation was undertaken.

Case I.—Carcinoma of both breasts; operations; recovery; the left was affected two and a half years after the right had been removed.

Harriet W., aged 60, came under my care in March, 1884, with a typical carcinoma fibrosum of her right breast, which had been coming on as a tumor for eight months, although the breast for a year previously had been the seat of pain. There were no enlarged lymphatic glands. Two and a half years before she had had her left breast removed for cancer, which had been growing for several years. When removed, it was an open ulcer. The axilla at the time of operation was not explored. On March 25th the breast was alone removed, and a good recovery followed. This woman was alive eighteen months later.

Case II.—Carcinoma of both breasts; operations at fifteen months' interval; death in five years.

Catherine T., aged 50, a widow, came to me on October 22d, 1866, with an infiltrating cancer of her left breast, a retracted nipple and dimpling of skin. It had been coming on six months. In December, 1865, I had removed her right breast for infiltrating cancer, and a good recovery ensued. The axilla was not explored. In March, 1867, the left breast was removed, and a good recovery ensued; no axillary glands were felt enlarged. November, 1867, tubercles appeared in the skin over the thorax. March, 1869, cicatrix of right side sound, of left contains tubercles; left axillary glands likewise enlarged. This patient died in 1870 from internal cancer.

Case III.—Carcinoma of both breasts; operations.

Miss V., aged 34, consulted me in November, 1877, for carcinoma of the left breast of two months' standing. I excised the gland, leaving the axilla unexplored, and convalescence followed. She left, a few months later, for America, where, one year later, the disease returned in the right breast, which was likewise removed. She lived about two years after the second operation, and died from chest complication.

Case IV.—Carcinoma of both breasts; one breast removed; survived operation three and a half years.

Miss B., aged 55, who had always had a retracted nipple in her left breast, consulted me in October, 1868, for a tumor which had been discovered one week, and was attended with pain which had existed for six months previously. When seen, the left breast was generally infiltrated, although the skin over the tumor and the lymphatic axillary glands were uninvolved. Breast removed; axilla not explored; good convalescence. October, 1869, tubercle in scar. February, 1870, tubercles multiplying; right breast infiltrated very slightly. Died March, 1872, three and a half years after operation. This patient's maternal aunt had died from cancer of the breast, and her maternal uncle from cancer of the throat.

Case V.—Carcinoma of breast of six months' standing; removal of breast; well for three years and a quarter, when return took place in scar and opposite breast.

Bridget W., aged 35, a married childless woman, applied to me on December 21st, 1865, with an open cancerous ulcer occupying the seat of the right breast, which had been re-

moved four years before for carcinomatous tumor of six months' growth. The patient had remained well up to nine months before. When seen, the left breast was likewise infiltrated with cancer, and the skin over the chest was covered with tubercles. Four months later the patient was sinking.

Case VI.—Double carcinoma mammæ; removal of one breast; return of disease in the opposite; removal of gland; death from chest disease 2½ years after first operation.

Miss C., aged 45, consulted me in 1874 with an infiltrating carcinoma of her right breast which she had discovered one year. The axillary lymphatic glands were not enlarged. On January 13th, 1875, I excised the breast, but did not explore the axilla. A year later the opposite breast became diseased, and was removed, and within six months tubercles rapidly developed over her chest, and she died from chest cancer on July 7th, 1877.

Case VII.—Carcinoma mammæ (double); one removed; second breast involved two years later.

Mrs. S., aged 46, the mother of one child, which she suckled, came to me with cancer of her left breast of six months' standing, and infiltration of the skin over the breast and of the axillary lymphatic glands. Two and a half years previously she had had her right breast excised for cancer of six months' growth. No operation was advisable. Subsequent history of case unknown; but she could not have survived many months. This patient's parents were alive, and one was 70 years of age. Her paternal grandmother had cancer of the womb. One paternal uncle had cancer of the stomach, and a second cancer of the liver.

Case VIII.—Cancer of both breasts; one successfully treated by injections of acetic acid.

Mary W., aged 62, the mother of ten children, all of whom she suckled, although with one twenty years before she had had an abscess in her right breast. She came to me on April 19th, 1866, with her right breast enlarged from carcinomatous infiltration, the skin over it adherent; the nipple retracted, and the axillary glands enlarged. There had been a lump below the nipple for five years. I injected acetic acid into the growth in many places, and on many occasions, and the operation was followed by sloughing of the whole mass, with the skin over it. The wound subsequently healed, and a good

scar formed. On November 29th she came to me with the opposite breast the seat of a central tumor. After this her powers soon began to fail.

Case IX.—Carcinoma of both breasts (chronic); lived six years; no operation.

Eliza C., aged ??, a single woman, came under my care on February 6th, 1865, with a chronic carcinoma of her right breast of five years' standing. The whole gland was infiltrated and hard. The tumor was fixed to the chest, and the skin over it was puckered and covered with tubercles. The nipple was retracted and also infiltrated; the axillary glands were enlarged. With tonics the patient's health improved, and the enlarged axillary glands disappeared. June, 1865, the left breast became involved, the first symptom being some general thickening; by November the infiltration of the gland was very general, but the nipple remained natural. In November the right breast began to ulcerate. January, 1866, cough appeared. April, 1866, the right arm became œdematous, the left breast was enlarged, and shot-like tubercles appeared in the skin over the breast. A few months later the patient died with chest trouble. The disease on the whole had lasted six years.

Case X.—Cancer of both breasts of three years' standing; no operation.

Mary S., aged 58, the mother of one child, aged 24, who, when suckling, so bit the left nipple that it ulcerated off, came under my care on July 26th, 1869, with cancerous infiltration of both breasts. Skin over them adherent and puckered, and axillary glands likewise swollen. The disease began three years before I saw her in both breasts at once.

The patient sank in the course of a few months.

Treatment of Recurrent Growths.—In the treatment of these a surgeon's judgment should be guided by the same principles of practice which influenced his decision in the case of the primary operation; that is, if the recurrent growth stands alone, and can be removed, the operation is justifiable. It may be that the growth, which appeared to be recurrent, was but the continued growth of some of the elements of the tumor which had not been removed at the original operation; and if so, the prognosis of the case would be more favorable

than it would otherwise be. It may be that such recurrence is due either to some local or lymphatic infection, or to both. Under all circumstances, however, if recurrent growths can be removed they should be so treated.

When only such portions of breasts as seemed affected with scirrhus were removed, what were called recurrences were frequent. Such growths were, however, wrongly named, for they would now be called by surgeons continued growth of pre-existing carcinomatous centres; and in past years when the lymphatic glands were neither removed when they were markedly enlarged, nor looked for by an incision when apparently free from enlargement, the same remarks are applicable. True recurrence, when not explicable by either of these methods, can only be explained by either the appearance of a fresh focus, or by a dissemination of the local disease by a more obscure local or lymphatic infection.

Cases Unfit for Operation.—An operation on the breast, as in other cases, may be inexpedient from either local or constitutional causes. Cases in which the disease cannot be entirely removed should be left alone; as well as those in which the disease can be wholly removed, but the patient, either from age or general condition, induced by any cause, is too feeble to undergo the ordeal of an operation.

Locally, tumors that are fixed firmly to the pectoral muscle and parts beneath; tumors complicated with lymphatic glandular troubles which cannot be eradicated, more especially enlarged glands above the clavicle; tumors associated with œdema of the arm on the affected side, as well as those with secondary external or internal metastatic growths, are not to be interfered with.

Cases of brawny carcinoma had better not be touched; nor had those of atrophying scirrhous or other varieties of the disease which are associated with the presence of tubercles more or less diffused about the skin. Cancer *en cuirasse* should never be interfered with.

To gain a good idea of the effects of operation in cancer of the breast upon the duration of life, a statistical comparison of the two classes of cases, that is of those operated upon and those left alone, must be made. In a former page (159) I gave a table of my own, showing the results of operation, and compared it with a second of Sir J. Paget, composed of cases in which no operation was performed.

I give here Gross's statistics upon the same question, he being the most recent writer upon the breast.

I have embodied his conclusions in the following table, which tells strongly in favor of operation:

	Not Operated Upon.	Operated Upon.
Died in between 5 and 12 months,	30.8%	10.5%
" " 12 " 24 "	37.7	33.
" " 24 " 36 "	11.3	24.
" " 36 " 48 "	9.8	9.9
" " 48 " 60 "	7.9	7.9
" " 60 " 72 "	3.4	5.
" " After 6 years	1.2	9.5
Average duration of life,	27 months.	39 months.

(One year being added to life by the operation.)

Velpeau stated in 1864, at the French Academy of Medicine, that out of 250 cases in which patients had survived the operation of amputation of the breast, twenty, or one in twelve and a half, had remained free from disease for more than five years, some few having been so for ten or twenty; and these operations must have been what would now be called incomplete operations, for before and at the date named the lymphatic glands were rarely touched.

Nunn likewise states that one case in thirteen on an average lasts from ten to twenty years.

Compared with these results, my own table is very favorable, for at least one-fourth of the cases lived from five to ten years or more. But it must be remembered that in at least a third of these cases the major operation of the complete removal of the breast and lymphatic glands was carried out.

I have been unable to make from my own cases, as Gross has made from his, a comparison between cases that have been operated upon, and those that have run their natural course, the difficulties of tracing patients who have not been submitted to operative treatment being greater than in those who have. My own table of operative cases, however, fairly supports Gross in showing the good effects of operation, and I think more forcibly, for in mine at least 14 per cent lived over six years against his 9.5 per cent, and 25 per cent lived over five years against his 14.5 per cent.

Life is therefore probably prolonged by operation, and more particularly by what must be described as a complete operation; indeed, by such a measure, even where it includes the removal of the cancerous breast, with its infected lymphatic glands, a permanent recovery may, in a certain proportion of cases, be looked for. In what exact proportion of cases this result can be secured, it is difficult to say, but if we adopt Gross's method, and assume that when a patient has survived an operation over three years without any local sign or general indication of recurrence, she may be pronounced cured, I do not think his proportion of 9 per cent of all cases is too high. Recurrence may, however, take place at a date long after three years, consequently Gross's view can only be an average one.

At page 164 a case is recorded in which, after operation, no recurrence took place for twenty-five years, and on looking over my notes I read the case of a woman, aged 47, who was operated upon after the local disease had existed for two years, who remained well for five years, when a local recurrence took place, and a second operation was performed; the second operation being followed, after the lapse of another five years, with a second recurrence which rapidly grew and destroyed life.

Case II. was that of a woman, aged 50, who, after having been operated upon for a disease of two years' standing, remained well for eleven years; then a local return of her trouble appeared, which was removed, and two years later she was well.

Case III. a patient of Mr. Birkett's, who had her breast removed in 1851, when 67 years of age; she remained well for twenty-three years, and at the age of eighty had cancer of the scar and opposite breast.

Case IV. also a patient of Mr. Birkett's, who had her breast removed at the age of 30; thirteen years later the disease recurred in the scar, when a second operation was performed. Two years later a second recurrence was followed by a third operation, and there the record stops.

Case V. In 1876 I removed the right breast of a woman, aged 48, for carcinoma, with a good result, from whom Mr. Hilton had, ten years before, in 1866, removed the left breast for the same disease.

In neither operation were the axillary glands felt enlarged, nor looked for by an exploratory operation. In 1879 the woman was well.

Gross gives, moreover, a table of forty-seven cases which he regarded as cured.

14 of these had been free from disease after operation for 3 years and some months.						
18 had been well from			4 to 6	years	and	some months.
7	"	"	6 to 9	"	"	"
5	"	"	9 to 12	"	"	"
3	"	"	12 to 15	"	"	"

The average time of cure was five years and nine months, and the disease had existed before operation on an average of eighteen months.

Mitchell Banks[35] more recently has given us a table of complete operations in which the primary tumor and lymphatic glands were freely removed. Seventeen out of sixty-four cases are reported to have been alive, and to have remained free from the disease for three years and upward, five having been well from three to four years; three from four to five years; three from five to six years; two for six years; two for eight years; one for twelve years; and one for thirteen years.

This advantage of operation is further seen when it is undertaken early. That a woman would have a better chance of gaining the full advantage of an operation for cancer when it is performed before lymphatic infection has taken place, is only what might be expected: the facts of Winiwarter and Oldekop partly prove this to be the case. "Thus, of 136 patients subjected to operation, 43, or 31 per cent, were free from glandular complication, and their average duration of life from the first observation of the disease to the fatal issue was 52.7 months; whereas of the ninety-three cases in which the lymphatic glands were enlarged and removed with the breast by operation, the average duration of life was only 39.3 months, or 13.4 months less than the more favored class. In the uncomplicated cases recurrence of the growth averaged eight months, in the complicated 1.9 months." The major or more complete operative measures apparently have done little or nothing in the way of postponing recurrence of the disease.

Gross adds that nearly one-third of the patients who had

been subjected to the radical operation were free from disease after the lapse of six years, while of the patients in whom no operation was practised only one survived that period.

Local Recurrence after Operation.—That this is to be expected general experience justifies, but at what period it may be looked for is most uncertain. Gross reports that of 368 patients operated upon, all but seventy-two had recurrences: that is, in four cases out of five recurrence is to be looked for. It would have been interesting to know in how many of these 368 cases the complete operation had been carried out. Winiwarter and Oldekop go further, and by an analysis of 203 cases demonstrate that:

In 39 cases it occurred within 15 days.							
" 50	"	"	"	1 month.			
" 38	"	"	between the	1st	and	4th	month.
" 18	"	"	"	4th	"	6th	"
" 16	"	"	"	6th	"	9th	"
" 19	"	"	"	9th	"	12th	"
" 9	"	"	"	13th	"	18th	"
" 6	"	"	"	19th	"	24th	"
" 3	"	"	"	25th	"	30th	"
" 3	"	"	"	31st	"	36th	"
" 2 after 3 years.							

From this table it is evident that in more than half the cases a recurrence takes place within three months of the operation; in a quarter of the cases recurrence may be looked for between three and twelve months; whereas in the remaining fourth the recurrence may be looked for at any time during the three years. After this time it is not to be expected, and it is to hoped that the patient may be regarded as cured.

The longer the interval between the primary operation and the so-called recurrence, the better the prognosis. The surgeon should always look upon cases of so-called recurrence within three months as probable instances in which some portion of the growth, or some of the lymphatic glands had been left behind; in fact, he should regard them as examples of continued growth of some overlooked carcinomatous centre.

When a cancerous breast is alone removed, writes Gross, recurrence is to be expected on an average of 3.1 months; when it, with diseased axillary glands, is taken away, that is,

when what is called the complete operation is performed, recurrence of disease averages 7.5 months; the more severe or complete operation apparently not doing much more than postpone recurrence for a few months.

It would seem from Winiwarter, Oldekop, and Henry's statistics, that half the patients that die from cancer do so from metastatic deposits, while the other half die from the baneful effects exerted upon the nutrition of the patient without cancerous degeneration of the viscera.

These authors compute the average date of death from metastasis from the first appearance of the disease at 31.2 months, or fifteen months after lymphatic infection; metastasis may occur from five months to eight years.

Metastatic Deposits.—To demonstrate the relative frequency of the seats of secondary deposits, Gross has compiled a table from his own cases, added to those of Arnott, Henry Morris, and Clark, published in the 27th volume of the Transactions of the Pathological Society of London, p. 264, in this way tabulating 128 post-mortem examinations, from an analysis of which he shows that secondary tumors were found in the

Axillary glands in	115	cases or	89.%	
Other	"	30	"	23.	
Lung	"	28	"	22.) 45
Pleura	"	30	"	23.)
Pericardium	"	3	"	2.3
Peritoneum	"	3	"	2.3
Brain	"	3	"	2.3
Œsophagus	"	1	"	0.78
Stomach	"	5	"	3.9
Jejunum	"	1	"	0.78
Liver	"	55	"	43.
Pancreas	"	1	"	0.78
Spleen	"	3	"	2.3
Kidney	"	5	"	3.9
Adrenal	"	2	"	1.5
Ovary	"	7	"	5.4
Uterus	"	2	"	1.5
Bladder	"	1	"	0.78
Bones	"	9	"	7.0
Muscles	"	2	"	1.5

He then concludes that when left to itself, carcinoma inevitably kills by its baneful consequences as a local disease, or by its remote multiplication.

That about one in six, or 16.7 per cent, of the patients die of the operation itself, but that the risk is not so great as to forbid interference, since it adds twelve months to the life of the patient.

That thorough operations definitely cure 9 per cent of all patients, or more than half as many more as it destroys.

That the patient is safe from reproduction if three years have elapsed since the operation, and that, finally, recurrence may be delayed for several months, or be prevented altogether, by clearing out the axilla at the same time that the entire breast is removed.

Gross maintains, moreover, that the proper measure is to remove the entire breast and its coverings by a circular incision, search for any outlying lobules that may be disseminated throughout the mammary region, dissect off the fascia of the pectoral muscle, and prolong the outer portion of the incision into the axilla, with a view to its thorough exploration. "Experience shows, first, that the seats of recurrence, or rather further spread of the disease after operation, are the skin, paramammary fat, remains of the mamma, and glands of the axilla; and, secondly, that recurrence in the axilla is far more frequent after removal of the breast alone than when that cavity was freed of its contents simultaneously with the extirpation of the breast."

That excision of the breast, with the axillary lymphatic glands, is a graver operation than excision of the breast alone, is what might be expected. Thus, an analysis of cases made by Dr. Stettegart [36] shows that of 264 cases in which the breast and axillary glands were removed, 61 cases, or 23 per cent, died; while of 130 cases in which the breast alone was removed, 10 cases, or 7.7 per cent died, the mortality of the complete operations being three times as great as of the incomplete.

This mortality, moreover, is evidently relatively greater, since it must be admitted that the complete method of operating in breast cases has only come into vogue during the last few years, when the treatment of wounds generally has been far more successful than it was in previous years.

The question before us consequently is evidently this: Can

the more severe operations on an average show either a definitely longer interval from recurrence, or a larger proportion of substantial cures? If experience can answer either of these questions in the affirmative, the surgeon is then justified in submitting his patient to the graver ordeal; if otherwise, is this the case?

As regards the recurrence of the disease after operation, Gross has shown that while in the minor measure of removal of the breast it is to be looked for on an average in about three months, in what is called the complete method it ensues in about seven and a half months. He, however, at the same time, believes he has shown that life is prolonged by this operation about one year.

In my own practice I have not, as a matter of routine, explored every axilla for enlarged lymphatic glands, and particularly in thin women, in whom, under an anæsthetic, the condition of the axillary glands can fairly be ascertained by manipulation. I have, however, always done so when enlarged glands could be made out, and when manipulation was difficult and its conclusions uncertain. I have had no reason to find fault with the results of my practice.

Out of 56 complete operations, private and public, performed, with all the advantages of improved wound treatment, I have lost 4, or 1 in every 14 cases, or 7 per cent; whereas, on referring to former times, when the condition of the axillary glands was only surgically considered when their enlargement was manifest, and wound treatment was as a whole less successful, I lost 8 out of 120 cases, or 1 in 15 cases, or 6.6 per cent.

It is true that the causes of death in both classes of cases can in a measure be explained away, and evidence brought forward to suggest that the operation in at least half the cases had little or nothing to do with the result. I have no intention, however, to do this, as the ultimate issue of the question must turn upon the main facts. Could a carcinomatous tumor always be removed in its early infiltrating stage, that is, when the disease is local, cures may be hoped for. When it is taken away after it has advanced and spread by lymphatic infection, the chances of a complete cure are remote. Other things being equal, free excision is more likely to cure. But are they equal if the mortality of the complete measure is in excess?

When this operation of removal is called for, it should, therefore, as a rule, be complete; that is, not only the tumor should be removed, but the whole mammary gland in which it is placed, with all affected or possibly affected skin and fat about it; but the practice of exploring an axilla as a measure of routine should not be followed, since it is without doubt a graver measure to the patient, and the advantage which it in theory possesses is not yet proved.

The removal of a breast for cancer is often expedient and necessary for purposes of relief rather than of cure; and a breast may often be removed with this object when the exploration of the axilla is neither called for nor justifiable. The surgeon's judgment in this matter is wanted in each case as it may come before him, and he is not to be governed by a dogmatic rule which experience soon proves is not a safe one.

A series of cases could readily be given by one surgeon to show the advantages of the complete measure; while another, or possibly the same surgeon, could give another series equally striking, to demonstrate the value of the so-called incomplete. A measure which is right and justifiable in one case may be wrong and unjustifiable in another. An operation which offers a prospect of cure, and removes what is a source of mental and bodily worry, should always be performed in preference to any partial measure, unless the general condition of the patient is such as to lead the surgeon to believe that any extra risk is incapable of being borne with safety. The advantages of the graver operation are not, however, so certain as to justify increased hazard to life.

On Excision of the Breast.—There is, in average cases, no great danger attending excision of the breast beyond that which accompanies any, even the smallest, operation. In feeble and aged subjects there is, however, much risk, and a certain proportion of cases may be expected to sink after the operation from pyæmia, erysipelas, or visceral disease, since these contingencies attend any operation or wound. From my notes of hospital operations on the breast for cancer, or rather of 200 consecutive cases, only 10 died from pyæmia, pneumonia, or erysipelas, the mortality being but five per cent, and these causes are yearly diminishing. Out of 176 cases in my own practice the mortality was 12, or 7 per cent. Gross gives a mortality of 16 per cent.

In operating for cancer it is unquestionably the wisest course to excise the whole gland. It is well not to be over-anxious about preserving too much integument, and if any doubt exists as to its perfect healthiness the suspected portion had better be excised. When enlarged lymphatic glands clearly exist they should be taken away, and in most other cases where their existence is suspected the axilla should be explored. It is always important, when dissecting out the tumor, to keep clear of all diseased tissues, and, in fat subjects, to take away much of the fat, since there is good reason to believe that an early return of the affection is too often to be explained by want of attention to these points. When the pectoral muscle is infiltrated it must be freely excised. The pectoral fascia should be closely inspected, since in it small cancerous nodules are often found, which, if left, would have been the centre of new growths.

The Operation.—In the removal of a breast the patient should be placed on her back with the shoulder of the affected side raised by a pillow, and the arm drawn out at a right angle to the body.

The incision should be elliptical, and made in a line parallel with the fibres of the pectoral muscle. When the skin is diseased and has to be removed, the incision may have to be circular, and bleeding is to be controlled by the pressure of the fingers of an assistant, or by torsion. The outer or pectoral incision should first be made, and carried well down to the free border of the pectoral muscle, the definite form of which is the best and surest guide to the base of the gland. The inner or sternal incision may then follow. The whole tumor should then be excised and dissected away, a few touches of the scalpel clearing it off the pectoral muscle. The axillary angle of the tumor should be divided last, as it usually contains the lymphatic cords and chief vessels that supply the gland. The incision can be extended upward into the axilla along these cords to explore or remove the glands. When this is done an incision at right angles to the wound backward is good for drainage purposes (Fig. 6). All bleeding vessels should be twisted, the surface of the wound cleaned with iodine water (℥ ij. ad Oi.), carbolic acid lotion (℥ iv. ad Oi.), bichloride of mercury (gr. x. ad Oi.), or chloride of zinc (gr. xx. ad ℥ i.), its edges well adjusted, a drainage tube in-

troduced at the most dependent part, and steady pressure applied by means of pads of antiseptic lint, gauze, or cotton wool, the wound being treated on ordinary principles.

The axillary glands should be removed more by enucleation with the fingers and a blunt dissector than by the knife; by care and a little patience this may usually be accomplished with safety. The surgeon must be careful not to draw too much upon the axillary mass where such exists, for by so doing he will probably drag the large vessels, and more particularly the veins, out of their position, and expose them to

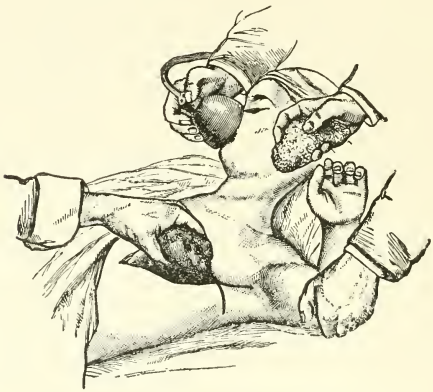


Fig. 6.—Excision of the Breast.

injury. All parts that are cut through should be ligatured first, and then divided on the distal side of the ligature. Banks advises that the axillary vein should be first exposed, after which no danger of wounding it will be experienced. Should the vein be wounded it should be tied.

Beyond satisfying myself that the drainage of the wound is satisfactory, I rarely remove the first dressing for three days, when, in favorable cases, what part of the wound was wanted to heal by quick union, has repaired, and the open surface is granulating. This I wash with iodine water, and dress with lint or iodoform gauze, soaked in a mixture of one part terebene and three parts olive oil, covering in the whole

with a sheet of Gamgee tissue. By these simple measures repair is carried out.

The essential point the surgeon has to observe in the operation is thoroughness; with this, success may be hoped for and reasonably expected; without it failure and disappointment must be the result.

Inadequate and too late operations have doubtless been the cause of many of our failures, and these again explain why it is that some practitioners refrain from advising operative interference, and consequently prevent their patients from seeking early surgical help.

When the profession, as a body, is led to look upon cancer of the breast in its origin as a local disease, and consequently one to be treated early; when surgeons are bold enough to advise, in early doubtful cases, an exploratory incision into the growth with a view to its excision should the disease be found to be carcinomatous, better results will be obtained. Excision is likely to be most successful when applied in the stage which precedes that of lymphatic infection, and when the cancer may be regarded as a local affection. Those who come after us will doubtless have to record better and more encouraging results than I can adduce in these pages.

On the Treatment by Caustics.—This form of treatment has its place in surgery, but it is not to be considered in competition with excision, since by excision alone can the whole disease be taken away with the greatest certainty, and in the shortest possible time.

Caustics are, however, useful in open cancerous ulcers, that cannot be excised, with the view of checking growth, preventing fœtor, lessening discharge, and diminishing hemorrhage.

A paste consisting of one ounce of a liquid extract of the sanguinaria canadensis, made by boiling down a decoction of the root, in which the same quantity of the chloride of zinc is dissolved, and then mixed with two ounces of the extract of stramonium, is very good; and so is the paste used at the Middlesex Hospital, made by mixing chloride of zinc and boiled starch with laudanum, till it reaches the consistence of honey. At the Middlesex Hospital, where this method of treatment is practised more frequently than elsewhere, Mr. H. Morris tells me it is carried out as follows: The whole cutaneous surface of the breast to be removed is first destroyed by the action of

fuming nitric acid applied by a glass brush; and in doing this, care is called for to guard against the effects of any running of the acid over the surrounding parts by the application of some grease, and having at hand an alkaline lotion to neutralize the acid.

When the skin has been destroyed, as indicated by its parchment-like feel and bloodless aspect, multiple incisions well into its substance should be made radiating from the nipple; the surgeon taking care not to cut so deeply as to draw bood.

Into the furrows thus made in the dead skin strips of finely prepared lint should then be pressed, the caustic paste having been previously spread upon and well pressed into its meshes, and all redundant paste scraped off; the object of this being to prevent the paste running over healthy tissue and causing distress. The breast should then be covered with cotton wool and a bandage.

In a day or two, when the caustic has done its work, the strips of caustic lint should be removed, the furrows in the breast deepened by fresh incisions, and strips of lint, prepared as before, applied. The same care being observed by the surgeon in his incisions not to draw blood.

By a repetition of this process every two or three days a breast may be removed in about three or four weeks, and, it is said, with but little pain.

Upon this point I am unable to speak from experience, as I have never removed a whole breast by this means. In some cases, painting an ulcerated surface over with liquefied carbolic acid is of great value, the acid acting as a caustic, disinfector, and anæsthetic at the same time.

Of late years Esmarch's powder has been much advocated, and I think with justice. It is said to be painless. It is made by mixing one drachm of arsenious acid with the same quantity of sulphate of morphia, eight drachms of calomel, and six ounces of powdered gum arabic. The surface of the sore is to be thickly sprinkled daily with this powder till a crust forms, and repeated if necessary.

As an ordinary application to a cancerous sore where these severe caustics are not employed, I find an ointment made of two drachms of resorcin with six of vaseline is very good. I have thought that it dissolved the epithelial structures, and

consequently tended toward a cure. I have, in a few cases, used resorcin as a powder, dusted over a cancerous surface, and with advantage. I have thought it tended to bring about its disintegration.

Injections of acetic acid into cancerous growths cannot be said to be quite useless, since, in one case already quoted (page 210) the injections brought the mass away; but their effects are so uncertain and unsatisfactory, that they are not to be relied upon, and by their use valuable time is lost.

When no local treatment of any special character is employed, and the disease must be left to take its course, pain must be assuaged by the internal or hypodermic use of morphia in one of its forms, the bimeconate being the best; or the local application of a drachm of the extract of belladonna, rubbed down with one ounce of glycerin, or of the extract of stramonium; or of an ointment containing a tenth part of cocaine. As a painless deodorizer, Gross speaks highly of a mixture of five grains of chloral hydrate to one ounce of vaseline.

Should great activity be displayed in the local disease, as indicated by extreme capillary injection and warmth, the local use of cold gives comfort and checks growth. This may be effected by means of one of Leiter's metallic coils or ice bags, and when these are inapplicable, by the employment of the usual lead lotion mixed with opium.

In foul cancerous ulcers a powder of fine iodoform or iodol mixed with boracic acid, in the proportion of one to four, is to be recommended; and in very painful sores cocaine used as an ointment or in solution, of about half a drachm or drachm to an ounce, gives comfort. Hamamelis has been strongly advocated as an application to open cancer. I have, however, failed to find its advantages.

Should local bleeding occur, a pledget of lint, soaked in a concentrated solution of alum, or of dried cotton wool which has been steeped in a solution of the perchloride of iron, will probably suffice to check it. The glycerin of tannic acid, applied on lint, is also under these circumstances useful.

CHAPTER XV.

A SERIES OF CASES ILLUSTRATING THE CLINICAL SYMPTOMS AND TREATMENT OF CARCINOMA OF THE BREAST. EACH CASE ILLUSTRATES A POINT.

CASE I.—Carcinoma of the breast, unrecognized in its early infiltrating stage; subsequent excision and recovery.

Mary A. C., a healthy-looking single servant, aged 37, came under my care on March 31st, 1877, with some swelling of her left breast. Her mother, maternal grandmother, and aunt all died of cancer of the womb; father alive and well. For three months she had had shooting pains in her left breast, and for one month had noticed that it had become hard and tender. She thought also the nipple was retracting. When I saw her, one lobe of the gland was certainly slightly fuller and harder than the other; it was likewise very tender to the touch. The nipple was not to any degree more retracted than that of the opposite breast. The skin over the breast was natural, and the axillary glands free. I was disposed to look upon the case as one of irritable mamma, and treated it accordingly. In a year she reappeared with a typical carcinomatous tumor, as indicated by a hard nodulated swelling in the position of the former tender and slightly hardened lobe; adherent puckered skin over the tumor, well-marked retracted nipple, and enlarged axillary glands.

I then removed the breast, tumor, and axillary glands, and a good convalescence followed. Four years later this patient was well.

Remarks.—In this case an exploratory incision into the growth when first seen would have saved delay and a surgical error, although the subsequent progress of the case has been one of hope. It tends likewise to support the practice of making an exploratory incision into any doubtful tumor of the breast when first coming under observation.

CASE II.—Carcinomatous tumor attached to margin of

breast, simulating adenoma; excision of tumor; patient well three years subsequently.

Catherine C., a married woman, 33 years of age, the mother of five children, came under my care in June, 1874, with a tumor in her left breast, which had appeared six months previously, when she had given up suckling her last child. The tumor had grown slowly since, and when seen was the size of a hen's egg. It was situated at the sternal margin of the left breast, and was hard, nodulated, and very movable. The skin over the tumor was free and natural; the nipple was normal; axillary glands natural. The growth was regarded as an adeno-fibroma and removed, the breast itself being left. A good recovery followed the operation, and the patient was well three years subsequently. A section of the tumor, and a careful examination of its structure, proved that it was an example of scirrhous carcinoma.

I regretted at the time that the whole breast had not been taken away. The last report of her case was, however, that she was well three years later, and under such circumstances the feeling of regret has disappeared. The tumor must have been, when removed, a local disease.

Case III.—Carcinoma of breast; dimpling of skin; excision of growth; recovery.

Mary A. T., a healthy-looking, childless, married woman, aged 30, came under my care on April 11th, 1881, with some thickening of the clavicular lobe of her left breast, which had been coming on for four month, after a blow. The tumor was ill defined and firm, but not so hard as scirrhus generally is; indeed, from its hardness alone no diagnosis could be made, particularly as the nipple was natural and there were no enlarged axillary glands. The skin over the tumor was, however, slightly dimpled; with this symptom the diagnosis was made, and the breast and tumor first incised and then excised. The disease was clearly on section carcinomatous. A good recovery followed.

In this case the value of the dimpling of the skin over a doubtful tumor was well displayed, since it enabled a definite diagnosis to be made as to the nature of the growth, and active treatment to be based upon it. Had this dimpling not existed, an exploratory incision into the tumor, for diagnostic purposes, would have been called for, prior to its excision.

Case IV.—Carcinoma of breast; painless progress; tumor and dimpling of skin; nipple natural; operation and recovery.

Susan V., a childless married woman, aged 58, came under my care in April, 1873, with a hard, nodulated tumor of the upper segment of the right breast, about 2½ inches in diameter, which had been slowly growing for two and a half years, and absolutely without pain. The nipple of the gland was natural; the axillary glands were not enlarged, but the skin over the tumor was dimpled. The breast and tumor were excised, and a good recovery ensued.

Case V.—Carcinoma of breast and axillary glands; skin over tumor and nipple natural; excision of disease; recovery; five years later the patient was well.

Eliza H., aged 42, the mother of four children, all of whom she suckled without trouble, came under my care on March 14th, 1872, with a tumor the size and shape of a small orange, in the axillary border of her left breast, and a mass of enlarged axillary glands beneath the anterior border of the pectoral muscle. The tumor and breast moved freely over the parts beneath; the skin over the tumor was normal and quite free; the nipple was natural. On March 22d the breast was removed and the axilla was cleared out. Recovery followed, the woman being well five years subsequently.

Case VI.—Carcinoma of the breast; attention drawn to part by retracting nipple, not from pain; operation.

Eliza J., a thin, healthy-looking woman, aged 60, the mother of six children, came under my care on January 6th, 1883, for a tumor in her left breast. She had had no pain, or even discomfort, in her breast, and her attention was first drawn to it by a nurse who, when dressing her, observed that the nipple was retracting. This led her to see her medical man, who sent her to me, when I found a small typical carcinoma fibrosum, as indicated by a stony nodular infiltration of the whole breast, with retracted nipple, and puckered integument over the tumor. The lymphatic glands were not involved. As the patient was thin, and apparently a good subject for an operation, and the disease seemed to be quite local, I excised the gland, and a good recovery followed. The axilla was not explored. The patient was seen eighteen months later, and she was well.

Case VII.—Carcinoma attacking breast at the seat of an

old abscess; nipple retracted; skin and lymphatic glands uninvolved; operation; recovery.

Emma C., aged 59, the mother of two children (the youngest twenty-eight years of age) came under my care on May 17th, 1880, with a tumor in her left breast. When suckling her last child, twenty-eight years previously, she had an abscess in her left breast. Eight months ago she found a lump situated in the breast beneath the scar of the old abscess, and this lump has steadily increased, although without pain. At present there is a hard, nodulated swelling, the size of an orange, upon the upper and sternal segment of the left breast. The tumor is clearly in the gland, which moves with it over the deep parts. The skin over the tumor is healthy and movable, except where the old scar of the abscess exists. The nipple is much retracted; the lymphatic glands are apparently uninvolved. May 21st, the breast and tumor were removed, and a good recovery followed. The tumor was a good specimen of carcinoma. I have been unable to trace the later history of this case.

Case VIII.—A carcinomatous tumor attached to the upper border of right breast following a blow; excision of tumor; patient well four years later.

Eleanor C., a childless widow, aged 40, came under my care in March, 1874, with a tumor four inches square, attached apparently to the upper margin of the right breast, although not in the breast, which seemed quite normal in all ways. The tumor had been growing for thirteen months, and had followed a blow received one month previously. It had grown slowly, and when seen was somewhat fixed, although movable upon the parts beneath; the skin over it was infiltrated, red, smooth, and part of the tumor. The axillary glands were free. On March 17th, I excised the tumor and skin over it, leaving the breast, which did not seem to be involved. A good recovery followed, and four years later this patient was still well.

Case IX.—Carcinoma of left breast; sloughing; operation and removal of axillary glands; relief.

Mary B. J., aged 55, the mother of two children, came under my care on October 3d, 1883, with a large fungating, bleeding, carcinomatous growth, involving the nipple and the whole of the left breast; also the axillary glands. It was movable upon the deeper structures. The disease had existed for six

years, had grown slowly for five, more rapidly for one. Nine months before admission into Guy's Hospital it began to break down, and for three months it had bled. On October 9th, I removed the whole mass, with the axillary glands, and a good convalescence followed. Some months later she was well, and had greatly improved in her general condition.

Case X.—Carcinoma of both breasts; excision of both at an interval of two and a half years: convalescence.

Harriet W., aged 60, a governess, came under my care in March, 1884, with a well-marked carcinoma of her left breast, of eight months' standing. It was the size of a walnut, and was placed on the axillary lobe of the gland. It was movable over the deep parts, and the skin over it was neither fixed nor dimpled. The nipple was retracted; axillary glands free. Two and a half years previously she had lost her right breast for an open cancer of many months' standing. On March 28th, I removed the tumor and breast, and a good recovery followed. The breast had almost disappeared by atrophy.

Case XI.—Carcinoma of the breast, axillary glands, and skin, with discharge from nipple; operation; recovery.

Mary M., a married woman, aged 48, the mother of three children, all of whom she had suckled, came under my care in September, 1874. Her grandmother had died of tumor of her breast at the age of 79. Her mother was alive and well. The patient had discovered a lump in her right breast about one year before admission, and at the same time a swelling in her right arm-pit. There was no pain in either swelling for some months, but for about six months pain appeared as the swellings increased in size. When seen there was a dense, hard, nodular swelling in the upper half of her right breast. The skin over the swelling was pitted like the rind of an orange, and adherent to the tumor beneath. The nipple was drawn inward, and on pressure over the tumor a clear brown fluid exuded from the nipple, which, when tested, was highly albuminous. In the skin above the tumor was a single, red, hard tubercle, which the patient said had followed a poultice; the axillary glands were enlarged, but movable.

On October 6th, the tumor, with the breast, skin over it, and axillary glands, were removed, a good recovery following. Sixteen months later the woman was well. The tumor was a good example of scirrhous cancer.

Case XII.—Rapidly growing tuberous carcinoma of the breast with all the well-marked symptoms; operation; recovery.

Emma P., a healthy-looking woman, aged 39, the mother of four children, all of whom she suckled without trouble, came under my care on March 12th, 1879, with a hard, nodulated tumor, measuring five inches by three, in the outer side of her right breast, to which the skin over it was attached by infiltration. The nipple was likewise retracted, and the axillary lymphatic glands enlarged. The tumor was first discovered only three months before, when it was the size of a walnut, the breast and nipple at that time appearing to be otherwise natural.

On March 18th, the breast tumor and axillary glands were cleared away, the patient making a good recovery. The specimen removed was an excellent example of rapidly growing soft cancer. It was soft, highly vascular, and lobulated, although clearly infiltrating the breast structure. No subsequent history of this case can be obtained.

Case XIII.—Carcinoma of the breast; slow, and later on, rapid growth; radical treatment with good result.

Mary M., aged 57, the mother of eight children, the youngest being 20 years of age, came under my care in April, 1876, with a hard, nodular tumor, measuring four by five inches in diameter on the outer and lower segments of her right breast. The skin over the tumor was "puckered," the nipple retracted, and the axillary lymphatic glands enlarged. The tumor had been growing for nearly three years, although for two and a half years its increase had been slow; since then it has grown rapidly. At first it was the seat of occasional pain; for the last six months the pain has been acute. The nipple was unaffected up to three months ago, when it began to retract; at the same time the skin over the tumor became dimpled, and later on puckered to the parts beneath. The axillary glands became likewise affected.

On May 2d, the tumor, with the breast and axillary glands, were cleared away, and a good result followed. The patient was well a year later. The history of this case illustrates two different conditions. The first one of slow and inactive growth; the second of rapid and active increase of the original tumor, and local and lymphatic infection of other parts.

Case XIV.—Carcinoma of the breast accompanied with severe pain; enlargement and resolution of lymphatic glands; operation; recovery; well three years later.

Ann N., aged 51, the mother of nine children, came under my care on February 10th, 1882, with a tumor the size of an orange, in the upper half of her left breast. It had been growing for three years, and for the first two and a half years gave but little trouble; for six months it had increased rapidly, and was the seat of severe pain. Three months previously the axillary glands enlarged, but they subsided under treatment. On admission the tumor is very hard; it has a smooth outline, and the skin over it is "puckered." The nipple is retracted. No enlarged lymphatic glands are to be felt. On February 14th, the breast and tumor were removed, the axilla was explored without result, and the case did well.

The tumor on section presented in its centre all the features of true scirrhus; around its periphery it formed a good example of the more rapidly growing and softer medullary cancer; the tumor exhibited at the same time the microscopical appearances of the slow and rapidly growing varieties of carcinomatous disease. In 1886 this patient was well.

Case XV.—Tuberous carcinoma of breast with infiltrated skin; natural nipple; enlarged axillary glands, following a blow, associated with albuminuria; no operation.

Maria R., a healthy-looking old woman, aged 72, came under my care in April, 1884, with a tumor in her right breast. She was a married woman, and had had eight children, all of whom she had suckled without trouble. She had always enjoyed good health. Five years ago she struck her breast severely against the corner of a washing tub; swelling and pain followed, and when the immediate effects of the injury had subsided, a lump remained. Six months ago this lump suddenly began to enlarge and became the seat of pain; for this she sought advice. Her family history was good.

When seen a tumor the size of a tea-cup occupied the upper and outer segments of the right breast. The skin over it was part of the tumor, and was red from congestion, fixed to the growth, and hard. It was in parts slightly œdematous. The nipple was natural. The axillary glands slightly enlarged. The breast and tumor moved freely over the pectoral muscle. Pulse good. Urine, specific gravity 1012, contained albumin. Under these circumstances no operation was advised.

Case XVI.—Carcinoma of the breast with tuberculated skin and carcinoma of spine; no operation justifiable.

Eliza R., aged 44, a single woman, came under my care on May 1st, 1877, with a tumor about two inches by one and a half in the right breast, which had been growing for about five months. When first discovered it was the seat of an occasional shooting pain. The tumor was hard and nodulated, and clearly formed part of the breast. It moved freely with the breast over the deeper parts. The skin over it was "puckered," and in it were many pea-like tubercular cancerous infiltrations. The nipple was retracting, and the axillary glands were unaffected. About six weeks before admission she became lame in the right leg, and pain passed from the loins down the leg. This so increased in severity that she was unable to walk, and sometimes in her sleep her right leg started.

On admission she was unable to sit up without experiencing great pain in her back from the mid-dorsal region to the sacrum, and there was tenderness on pressure over this region, and over the right sciatic nerve. She could flex the right thigh partially, but she could not lift the leg from the bed. There was no loss of sensation in the limb. With these symptoms it was assumed that secondary disease existed in the spine, and no operation was advised.

Case XVII.—Carcinoma of the breast; tubercular infiltration of the skin; ulceration of the skin; no operation justifiable.

Eliza G., a fairly healthy-looking woman, aged 53, the mother of two children, came under my care on June 20th, 1877, with a hard scirrhous tumor two and a half inches in diameter, in the axillary lobe of her left breast, which had been growing for one year. The skin over the tumor, breast, and sternum, was mottled red, as if inflamed, and to the touch was tuberculated, and irregularly infiltrated with carcinomatous elements. At one spot the skin was ulcerated from the breaking down of the skin cancer. The breast was fixed to the deeper parts, clearly from the extension inward of the disease. The axillary glands were likewise infiltrated. The nipple was not retracted.

Case XVIII.—Carcinoma of the breast of a woman, aged 25, in two separate masses; operation refused.

Mrs. S., aged 25, discovered, in January, 1872, a small lump in the upper half of her right breast, but as it gave no pain she disregarded it. She had been married seven years, but had not been pregnant. When seen in February, 1873, one year after the discovery of the tumor, the upper half of the right breast was occupied with a nodulated mass the size of an orange, which evidently infiltrated the gland with the skin over it, which was puckered. Below the nipple there was a second tumor the size of a walnut, which was unconnected with the first. The skin over it was dimpled. The nipple was retracting, and the axillary glands enlarged. Operation was refused.

Case XIX.—Infiltration of breast following the disappearance of cystic formation; cupping of skin from scar of abscess which existed twenty-two years before.

Susan K., aged 48, the mother of one child twenty-two years previously, when she had an abscess in her right breast, came to me on November 27th, 1865, with great thickening and enlargement of her right breast, associated with pain. The integment over it on the outer side was drawn down to the gland (dimpled). Two years previously this woman had been under my care for two swellings, which were taken to have been cysts, in the same breast, which had disappeared. November 5th, 1866, the left breast became indurated like the right, and this rapidly developed whilst the right remained stationary; nodules appeared also upon the skin. Operation refused.

The cupping of the skin was due to the contraction of the scar of the abscess which had existed twenty-two years before, the enlargement of the breast making the depression more marked.

CHAPTER XVI.

CYSTIC TUMORS OF THE BREAST.

We now come to what is at once the most interesting, and at the same time the most perplexing section of the whole range of diseases of the breast, since it is cystic disease of the gland that, to my mind, makes any pathological arrangement in such a work as this of little utility. It is on this account that I determined in these pages to consider breast diseases purely by the light of clinical experience.

As I have already urged, there are those who, at the present day, treat of cystic disease of the breast as one of the nature of sarcoma. I, on the other hand, contend that this grouping is not right, under the belief that cysts are a part of the pattern or architecture of most tumors of the breast, whatever be their nature, save and excepting scirrhus, and even with this disease cysts are found.

Thus we clinically meet with simple cysts, cystic adeno-fibromata, myxomata, sarcomata, carcinomata, and what not, and it is left, as yet, entirely to clinical experience to say what is the natural tendency of cystic disease.

I shall, in the following pages, describe cases of all these varieties of cystic disease, and I shall, I trust, show that the greater proportion by far of all these cases is, so far as I can learn, cured by free removal: that is to say, that recurrence after such treatment is exceptional.

The bearing and importance of this fact are obvious, for if it be so, there is much reason for insisting upon the restriction of the term sarcoma at the bedside.

Under this heading I propose to group all tumors of the mammary glands made up of cysts, whether those cysts are multiple or single, whether they contain fluid alone, or are more or less filled with adeno-fibromatous, adeno-sarcomatous, or adeno-carcinomatous intracystic growths.

I shall not stop to inquire into the different methods by which the cysts are formed, since I believe it to be impossible clinically to make out, otherwise than in exceptional cases, whether the cysts are due to an obstruction of a galactophorous main or branch duct (retention cyst); or to the exudation of fluid into the intercellular spaces of the connective tissue of the breast (lacunar cysts); or to the growth of papules into a duct or acinus from the connective tissue of the breast and their subsequent junction. Neither can the surgeon speak with certainty in all cases as to the absence or presence of an intracystic growth, nor as to the nature of the growth.

In a large proportion of cases in which the cyst contains solid growth, a diagnosis of its nature can, however, be made, but the diagnosis is then more determined by signs and symptoms other than those associated with the presence of a cyst. To these points attention will be drawn later on.

I would, however, for the sake of convenience and possibly of clearness, divide the subject up into certain sections, and consider:

1st. The cystic degenerations of the breast as met with in the old, as well as in glands which have long ceased to be active; involution cysts as they are called (Plate IV., Fig. 9).

2d. Cystic tumors of the gland, single or multiple, of glandular, duct, or connective-tissue formation without intracystic growths (Plate IV., Fig. 1).

And, 3dly, cystic tumors of the breast of whatever kind in which papillomatous, adenomatous, sarcomatous, or carcinomatous intracystic growths are present (Plate IV., Figs. 2, 3, and 4).

These three classes will be considered in order.

Group I.—The Cystic Degeneration of the Gland as met with either in the Old or Obsolete Gland.

This condition must, without doubt, be recognized, for it is found in the breasts either of the old, or of those in whom the glands have ceased to be active, and are, as it were, undergoing involution changes. Meaning, by this term, involution change, an irregular form of atrophy, a condition to be expected in any tubular or acinous gland, and, as a fact, one

well known in the kidney, the thyroid, and occasionally in the pancreas.

It may be that a single lobe or lobule is undergoing this special form of degeneration, but more probably the change will have affected the whole gland, which, on dissection, will be found to be made up of innumerable small cysts, varying from the size of a hemp-seed (the more common size) to that of a pea, whilst in exceptional cases these dimensions, in isolated cysts, may be considerably exceeded.

The cysts appear more as a series of dilatations of the lactiferous ducts (varicose ducts) than of the gland structure, although in certain cases both ducts and gland structure are involved.

On dissecting these cases and on separating the ducts, or rather unravelling them, the gland as a whole may be involved, and in a dissection I made many years ago, the breast appeared, when suspended by the nipple, to be made up of strings of small cysts connected together by the main and branch ducts. Some of the cysts had direct tubular communication with the neighboring cysts, as proved by the passage of bristles through the ducts from one cyst to another, or by the fact that many of the cysts and ducts could be inflated by means of a fine tube introduced into one or other of the nipple ducts. In many cases, however, this direct communication cannot be made out.

These cysts, when unopened, have usually a greenish or black appearance, and when opened they are found to contain a blackish viscid or mucoid fluid, more or less coagulable by heat, and mixed at times with fat and epithelial elements, such being the products of degenerating epithelium.

The breast, thus affected, feels on manipulation in thin subjects as a coarse gland, with here and there a pea-like tumor, whilst in fat women the change often cannot be clinically recognized.

This change is rarely associated with pain, or with a greater amount than can be described as uneasiness. There is seldom any discharge from the nipple in these cases, although there may be at times. Why there should not be a discharge always can only be explained by the fact that the ducts become obstructed, and probably by their epithelial elements.

In exceptional cases some enlargement takes place of a

single cyst or group of cysts, and under such circumstances a cystic tumor is formed, for which surgical advice is sought. I have seen many of these cases. In some the cyst was single, and relief was given by simply drawing off the fluid by means of a small trocar and canula; in other cases two or more cysts existed; in a few they were still more numerous and showed signs of activity, so that excision of the affected lobule or whole gland was required.

In not a few cases the cysts have become the seat of intracystic, sarcomatous, adenomatous, or cancerous growths, for which extirpation of the whole gland has been necessary. To these attention will be drawn later on.

What I would wish now to be recognized is the fact that there is in the mammary glands which have long ceased to be active, and in those of women past child-bearing, a cystic degeneration of their ducts and glandular structure which may simply remain as such or take on active changes. Under the latter circumstance, a cyst or many cysts may either enlarge so as mechanically to cause trouble or become the seat of intracystic, adenomatous, sarcomatous, or carcinomatous growth which will run the usual course of such tumors.

In the two following cases this cystic involution change is well illustrated. In the first the whole breast was excised, and a good result ensued. In the second some of the cysts were relieved by tapping, when the remainder disappeared. This favorable result is one that not infrequently follows an expectant treatment, but it is not in the majority of cases to be expected. The hope of obtaining such a success by leaving things alone, should not induce the surgeon to withhold his hand in any case in which the breast is clearly enlarging, although it may be sufficient to sanction a watching line of treatment where the progress of the trouble is slow.

Case I.—Involution cysts of breast which had long ceased to be active, simulating cancer; excision of gland; recovery.

Mrs. T., aged 52, the mother of many children, all of which she suckled, consulted me in May, 1885, for some affection of her right breast, which had been slowly coming on for about six months. It began as an enlargement of the axillary lobe, and later on as a swelling of the whole breast. At times there was a discharge of a clear fluid from the nipple and some slight pain.

When seen the whole breast was coarsely enlarged and indurated; one lobe, the axillary, seemed to be generally infiltrated with some new material; the other lobes were full of nodules which appeared to be cystic. The nipple was natural, but pressure upon the breast caused from it a slight discharge of a serous fluid. The skin over the breast was healthy, as were the lymphatic glands.

I regarded the case as one of carcinoma, with cystic degeneration of the gland, and advised excision.

On May 13th, the operation was performed, and a good recovery rapidly followed. This lady is still well.

Description of Breast by Mr. Symonds.—Just beneath the nipple was a cyst, one inch in diameter, with a thick dark wall, imbedded in condensed breast tissue, containing many smaller cysts. Everywhere through the breast these cysts existed, and all were filled with a creamy gray fluid, which exuded as so many beads when the breast was squeezed. The galactophorous ducts were filled with this same material, which exuded from the nipple on compression. The whole organ had a uniformly whitish-gray color, but nowhere was any solid growth visible. The outline of the breast seemed also normal, and there was no infiltration of, or alteration in, the surrounding fat.

Microscopical Examination.—The fluid was not examined fresh, but from its resemblance to that seen in similar cases, and from its appearance in the hardened sections, it, no doubt, was composed of degenerated cells and fatty granules.

The appearances seen in the sections might be shortly described as showing the ordinary breast tissue containing many cysts (Fig. 7). There are groups of small tubes cut in various directions, some having a distinct lumen, many showing only a number of irregular cells. These groups are always surrounded by fibrous tissue containing fat vesicles, and represent the ordinary breast lobules. The adipose tissue is in some places tolerably abundant. Many of these tubes are much enlarged, having a wide lumen, occupied in many instances by granular matter, and lined with two or more rows of cells. As the accumulation of secretion increases, the central aperture enlarges until a small cyst is formed visible to the naked eye. These changes are all obvious in the woodcut below, and occur in all parts of the breast.

Besides these cysts with a round lumen, there are many apertures with a sinuous outline, and many with villi or buds projecting toward the cavity. These are all lined with two or more rows of cells, the inner row being more or less columnar, and taking the stain (logwood) more deeply than the outer or irregular cells. The buds or projections are covered by the same cells, and have vessels and fibrous tissue as a basis. The appearances are shown in the illustration.

Again, the largest cysts have a wall composed of lamellæ of fibrous tissue, are lined by large columnar cells, and contain some of the granular material above described. The

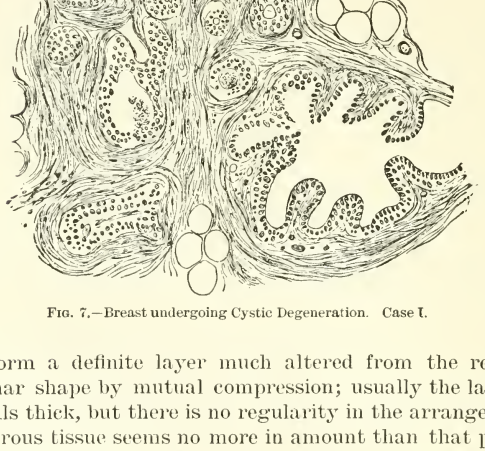


Fig. 7.—Breast undergoing Cystic Degeneration. Case I.

cells form a definite layer much altered from the regular columnar shape by mutual compression; usually the layer is two cells thick, but there is no regularity in the arrangement. The fibrous tissue seems no more in amount than that proper to the breast, the cyst formation appearing to be the only morbid change. From the description given above, and from the appearances presented in the drawing, these cysts all seem to form out of the mammary acini and ducts.

Case II.—Cystic degeneration of breast which had never secreted milk.

Mrs. S., aged 34, the mother of one child 17 years of age, consulted me in February, 1880, for some disease of her right

breast. She had suckled with her left breast, but not with her right, as that gland had never secreted milk, although it in all other ways appeared to be natural.

Three months before I saw her she accidentally discovered a lump in the right breast, which had steadily increased. It was not the seat of pain, but only of uneasiness. When I saw her there were four or five nodules the size of nuts in the gland, and these, from their globular outline, I took to be cysts. The whole gland felt coarse to the hand, and knotty.

I punctured one of the nodules for diagnostic purposes, and let out some serum. The others I left. Six months later when last seen, there was no change in the breast.

The cysts were doubtless due to cystic degeneration of the gland from involution changes.

Group II.—Cystic Tumors of the Gland; Single or Multiple; of Glandular, Duct, or Connective Tissue-Formation without Intracystic Growths.

That these cystic tumors of the mammary glands are not uncommon in practice must be fully recognized, although it must be acknowledged that they are too often not diagnosed until by some error they have been subjected to surgical operative treatment.

I take it few surgeons have been so fortunate as not to have removed a breast for a supposed cancer which turned out to be a cyst; and fewer still who have not, as spectators of such a case, been well sprinkled with the fluid of a tense cyst, accidentally opened by the hand of a surgeon in his attempt to cut into or excise what he regarded as a solid tumor.

Formation of Cysts.—These cysts are doubtless developed in several ways. Some are unquestionably "*duct cysts,*" that is, they are formed first by an obstructed and subsequently by a dilated irritated duct, the duct being more commonly a branch than a main duct, and occasionally a duct leading directly into an acinus of the gland. When the branch is a large one the cyst is likely to be single; when it is placed nearer the gland structure the cysts are more likely to be numerous. The cystic tumor in the former case appears as a globular, tense, more or less deeply placed growth; and in

the latter as an unequal enlargement of one of the lobules of the gland, with a more or less bossy outline and semi-fluctuating feel; this latter symptom turning much upon the size the cysts attain and the depth of gland structure which covers them in.

The fluid contained by these cysts varies much. In the majority of cases it is clear and serous, in others it will be brown or slightly blood-stained, in a few cases it will be viscid and mucoid. When it is deeply blood-stained or sanguineous the surgeon should suspect that it is not a simple but a proliferating cyst in which some intracystic growth exists. In almost all cases the fluid will be albuminous; at any rate, I have not yet met with an example in which it was otherwise. At times fluid may escape naturally or may be pressed from the nipple, and when this takes place the diagnosis of a duct or glandular cyst may with confidence be made. In half the cases of this affection no such symptom will, however, be found, but this fact need not diminish the value of the symptom for diagnostic purposes when it is present.

Others of the cysts have a "connective-tissue origin." That is, they originate outside the ducts of the gland structure, and are formed by the effusion of fluid into the connective tissue which binds the lobes and lobules of the gland together. Such cases are usually single, but may be multiple. They are commonly of slow formation, and as a result have thick walls. They are always smooth on their inner surface, and as a rule contain serous fluid. At times the fluid is, however, mucoid or dark. When the cyst appears in the breast of a thin woman its tense globular outline, unassociated with any of the symptoms which are recognized as characterizing the existence of a cancerous or other tumor, should suggest its nature as well as its treatment, for the puncture of the swelling with a fine aspirating needle will prove much.

When the cyst shows itself in the breast of a fat subject the diagnosis must be difficult, but its true nature should ever be suspected, even when all other symptoms of more solid growths have by the lapse of time failed to manifest themselves. The more breast tissue there is to surround a cyst or cystic tumor, the greater the difficulty of diagnosis. The longer the tumor has existed without the manifestation of the well-recognized symptoms of cancer or other growth, the

stronger the probability of its being cystic. In all doubtful cases, however, the fine exploring needle of an aspirating syringe will avail much for diagnostic purposes. In but few of these cases can the surgeon without exploration diagnose between the simple cyst and the cyst with proliferating intracystic growth. Simple cysts of the breast exist, without in many cases ever developing into anything else, or becoming the seat of solid growth. With the majority of cystic tumors this, however, is not the case, for what may seem to be the most simple or innocuous cyst may be expected, if not cured, to become the seat of some proliferating intracystic growth, which will be adenomatous, sarcomatous, or carcinomatous, according to the tendency of the tissue to form, and of the individual to develop, either special variety.

The mere presence of a cyst in the mammary gland must be accepted as evidence of some unnatural local irritation, inflammatory or otherwise, whether that irritation has originated in, or become localized about a gland duct, lobule or gland, or connective tissue. If the irritation is subdued or subsides, a cure, or at any rate freedom from fresh developments of the local trouble may be looked for; but should the local irritation continue or intensify, fresh developments must be expected, and such of necessity will assume the form of a new growth either of the glandular, epithelial, or connective-tissue type, and lead on to the formation of an adenomatous, epitheliomatous, or sarcomatous cystic growth, to which attention will now be drawn. In rare cases the cyst will suppurate and undergo a spontaneous cure. I propose to illustrate the clinical history of this group of cystic disease by means of cases, each case telling its own tale.

Case III.—Duct cyst in breast with retracted nipple; albuminous fluid drawn off; cured. (Reported by Mr. H. Caddy.)

Susannah B., a healthy-looking, well-nourished woman, aged 24, was admitted into Lydia ward, under Mr. Bryant's care, on the 9th of September, 1872, with a large hard substance in the centre of her left breast. The nipple had quite disappeared, from retraction, but the swelling seemed to point at the surface about an inch above where the nipple ought to be. There was no glandular enlargement in the axilla or above the clavicle.

The patient's family history had been good, and she herself had been healthy up to thirteen years old, when her back began to grow out both backward and to the right side. She had no remembrance of any injury, and a year later she was employed in turing the mangle.

About four years ago her tonsils were cut, and two years later she felt slight pain in the upper part of her left breast, which became more severe when she raised her arm. One month before admission she noticed a lump about the size of a filbert, which was movable; a fortnight later there was a discharge from the nipple. She then sought advice from a medical man, who told her to bathe it with warm water; this benefited her at first, but the lump grew, and the discharge from the nipple increased and became mixed with blood. She then came into the hospital.

On admission. A very tense globular swelling, the size of an orange, was present in the centre of the breast. The nipple was flattened out and somewhat retracted; it discharged a yellow glairy fluid, which could be increased on pressing the tumor. The diagnosis of cystic disease of the breast was made.

September 12th. A small canula was introduced into the cyst, and about four ounces of a pale yellow fluid were drawn off. A drainage tube was introduced into the cyst.

16th. The breast discharged a little for a few days, but it ceased on the 19th, and on the 21st she left the hospital well.

Two years later the patient reported herself as still well.

Case IV.—Cyst in breast, which disappeared after tapping.

Eliza T., aged 43, a married, childless woman, came to me February 12th, 1886, with coarse, indurated breasts, and a tense, globular tumor, the size of a walnut, in the left gland, which seemed to be a cyst; there was no discharge from the nipple. For diagnostic purposes this cyst was punctured, and clear serous albuminous fluid drawn off. By April 16th the swelling had gone. Six months later no return had taken place.

Case V.—Duct cyst in breast, which spontaneously suppurated; was opened and cured.

Eliza H., aged 40, a married, childless woman, came under my care in April, 1870, with a tumor in her right breast, which

had been coming for five years and was increasing slowly. She had had serous discharge from the nipple for two years. The axillary glands were not enlarged. At present there is a free discharge of a clear fluid from the nipple, which runs without, but can be increased by pressure. At times the fluid is blood-stained. There is a tumor the size of an orange at the lower part of the gland. An incision was made into the cyst at its lower part, and some ounces of pus were evacuated. A good recovery followed.

It is probable that the spontaneous suppuration of a simple duct cyst of the mamma is rare. I have not seen any other example than the one recorded, in which it was clear that this took place.

In Prep. 4753 of the College of Surgeons there is, however, a cyst of this kind, in which at one spot the inner surface of the cyst appears thinly covered with lymph, demonstrative of an inflammatory action. In this case, as in the one recorded in this paper, the nipple was retracted from traction on its ducts.

The following interesting case has been recorded by Mr. Birkett (Guy's Hosp. Reports, 1872–73), and illustrates the same point.

Case VI.—Duct cyst of the breast, following a contusion; retracted nipple; twelve years later spontaneous suppuration and recovery.

A delicate single lady, aged 40, consulted Mr. Birkett for a bloody discharge from the nipple, which she had observed for nine or ten years. She attributed it to a blow. The nipple was retracted. When seen a small, fluctuating, painless swelling was present near the nipple, with induration of the gland tissue around it. By compressing the tumor, serum escaped from the nipple. Four years later, when but little change had taken place in the tumor, the discharge from the nipple ceased and the tumor inflamed. Suppuration soon followed, and the abscess burst, when more than ten ounces of pus escaped, and a piece of solid substance as long as the little finger escaped. This was the statement of the patient. The discharge, which continued several days, diminished; the hole, which looked very deep at first, contracted and filled up, and at last became healthy. In fact, adds Mr. Birkett, the disease

was cured by the efforts of nature alone, and has never reappeared in the eighteen years which have since elapsed.

Case VII.—Cystic tumor of breast; cured by an incision into its cavity, and drainage. (Reported by Mr. Duckworth.)

Louisa N., a healthy-looking married woman, aged 45, was admitted into Lydia ward, Guy's Hospital, on May 1st, 1879, under Mr. Bryant's care. Her paternal grandmother had cancer of the breast. About three months ago she felt some pain in the region of the left breast, but noticed no lump for a month, when she felt one about the size of a walnut on the outer side of the gland. It was freely movable, and when she slept on her right side would slip toward the inner side. It was occasionally the seat of a gnawing or shooting pain. She has had one stillborn child, and never suckled.

On admission. There is a hard, irregular ovoid, lobulated swelling about the size of an egg, on the outer side of the left breast. It is very freely movable, and the skin over it is not infiltrated. The tumor seems, however, to be slightly attached by one end toward the nipple, which is normal.

Operation.—May 6th, under chloroform, an exploratory incision was made about two inches in length on the outer side of the breast into the tumor, which was found to be a cyst. When opened about an ounce of clear fluid escaped. The cavity, which was smooth, was washed with iodine and water, after which a drainage tube was put in and the wound dressed with lint soaked in terebene oil.

8th. No discharge, wound healthy, drainage tube removed. Temp. 97.8°.

12th. Tinct. ferri perchlor., ♏ x.; tinct. calumb., ♏xx.; aq., ℥ i., t. d. s. Temp. normal.

20th. The wound has nearly healed.

24th. Discharged cured. Some months later this patient was well.

Case VIII.—Cyst in breast, simulating carcinoma; exploratory incision; plugging of cyst; recovery.

Martha J., aged 50, a married woman, came under my care on January 9th, 1886, with a tumor the size of an orange, occupying the centre and axillary half of the left breast, retracted nipple, and healthy skin over the tumor. No axillary glands found enlarged. She first noticed the lump five years previously, which had steadily and almost painlessly increased.

It was the seat of an occasional shooting pain. The tumor and breast were one; it was hard and inelastic; no nipple discharge. An exploratory puncture or incision was determined upon. On January 19th, when the woman was under the influence of an anæsthetic, fluctuation was detected; an incision was then made into the tumor in a line radiating from the nipple, and a cyst opened; three ounces of a dark-colored fluid, containing cholesterin, was evacuated. No intracystic growth was found, and the lining membrane of the cyst was smooth. The cavity exposed was then plugged with iodoform gauze dipped in terebene oil to excite suppuration, and the case did well.

Case IX.—Cyst in breast treated by incision; doubtful thickening remaining; well. (Reported by Mr. Duckworth.)

Harriet S., a single woman, aged 35, was admitted into Lydia ward on May 21st, 1879, under Mr. Bryant's care. Six years ago she had an abscess in her neck. About four months ago the patient experienced, when at work, a dragging pain in her chest and shoulder, and found upon examination a small hard lump, about twice the size of a pea, in her right breast. It was freely movable, and occasionally gave pain at the back of her shoulder. She has no recollection of having received an injury.

On admission. To the left of the nipple of the right breast there is a hard, irregular, lobulated lump the size of a small orange, with a base occupying about the area of a half-crown. It is freely movable, and does not infiltrate the nipple or breast. The axillary glands are slightly enlarged.

May 21st. She is menstruating; her menses have been irregular for some time. They generally last ten days.

27th. Under chloroform, an incision was made over the tumor, radiating from the nipple, and about two and a half inches in length. Having cut into the tumor, about an ounce of brownish fluid escaped; the walls of the cyst were smooth. The parts were washed out with iodine and water and a drainage tube introduced; the edges were then partially brought together with four sutures.

28th. Temp. 98°, pulse 88.

29th. Temp. 98.2°. Two sutures taken out; wound looks healthy.

June 1st. Temp. 98.9°, pulse 96. Wound closed well, nar-

row line of granulations on surface. A lump about size of a hazelnut felt below the incision.

24th. Patient left the hospital cured.

Case X.—Cyst in right breast; treated by a free incision; no intracystic disease; patient well four years later. (Reported by Mr. Gowan.)

Mary S. R., aged 40, was admitted on October 15th, 1883, into Lydia ward under Mr. Bryant's care. Patient is a tall, well-formed, and well-nourished woman. She is a widow. Has never borne a child, and has never been injured in the breast. Two months ago she first noticed a lump in her right breast about the size of a pigeon's egg, and a little to the right of the nipple. It has grown somewhat rapidly since.

On admission. The right breast does not appear much larger than the left. Both are well developed and firm. The right nipple is slightly tinged with brown, but not retracted, nor is the skin dimpled. A tumor, about the size of a large orange, occupies the upper and outer quadrant of the right breast; it is globular and smooth, and indistinctly fluctuates. Neither the skin nor adjacent muscles are implicated apparently.

October 16th. Under chloroform the tumor was punctured with a scalpel, when about one and a half ounces of blood-stained serum gushed out. The incision was enlarged, and the cyst walls were found to be free from growth, smooth and thin. The wound was plugged with iodoform gauze, and dressed with gauze and flannel bandages; the arm was fastened to the side.

November 19th. Left hospital; there is still an open granulating wound $1\frac{1}{2}$ inches long by $\frac{3}{4}$ inch. Patient's general health is good.

Three years later this patient was quite well.

Case XI.—Deeply placed cyst in sternal lobe of right breast, simulating adenoma in gland; exploratory incision; plug. (Reported by Mr. C. Lloyd Jones.)

Margaret V., a domestic servant, aged 37, was admitted into Lydia ward on February 23d, 1877, under Mr. Bryant's care.

She stated that her father died at seventy years of age of some internal tumor, and her mother at thirty of hepatic disease. Her brother and sisters were all healthy. She was

unmarried, and always enjoyed good health. She fancied that she had become a little thinner during the past winter, and lately her menstrual intervals had become three weeks instead of a month. Three weeks before admission she happened to place her hand on her right breast, when she noticed a lump there. She felt no pain in it, and it had not increased in size since it was first noticed.

When admitted, the hand pressed flat against the breast at once detected, at the upper part of the right breast, a tumor which was nearly circular in shape, about two and a half inches in diameter, and flattened. It felt hard, and its surface was distinctly lobulated. The tumor was movable with the breast, the skin was nowhere puckered nor adherent, and there was no pain on manipulation. The nipple was normal. No enlarged glands in axilla or elsewhere.

The patient could assign no cause for the appearance of the tumor, and she stated that she was, as she appeared to be, in very good health.

March 9th. Under an anæsthetic an incision was made into the tumor, when blood-stained serum escaped; the lining membrane of the cyst which occupied the posterior part of the lobe was smooth; the cyst was plugged.

15th. Wound nearly well. The patient had not had one bad symptom or any rise of temperature.

Remarks.—In this case the true diagnosis was not at first made, nor was the true nature of the case suspected; the tumor had none of the appearances of a cystic growth, since it was quite inelastic, and its surface was nodular and hard.

The cause of this error in diagnosis is to be explained by the position of the cyst, which was covered in by a gland of quite three-quarters of an inch in thickness, the gland giving the nodular outline and yielding the firm feel.

At one time the question of infiltrating carcinoma was considered, on account of the growth so closely involving the gland and appearing as an infiltration, but this was dismissed in favor of the adenoid view, the outline of the tumor appearing more of the latter disease.

Had this case been punctured for diagnostic purposes its true nature would have been discovered.

Case XII. Cyst of mamma mistaken for carcinoma, and excised; cure. (Reported by Mr. C. E. Perry.)

Anne F., a married woman, without children, aged 47, was admitted into Lydia ward, under Mr. Bryant's care, on January 18th, 1875, with a hard round swelling, about the size of a mall tennis ball, in the upper and outer part of her left breast; it was movable with the breast and without pain except on pressure. It was regarded as a carcinoma. It appeared that an aunt on her mother's side had died of cancer in the breast. She herself had had good health until about five months before admission, when she felt a swelling about the size of a small egg in her left breast; it remained about the same, without pain, for three months, when, pain coming on, she sought advice, and had some embrocation, which she left off after a few days, as it brought out a rash. She then fomented it, and nothing else was done up to the date of her admission.

January 26th. Chloroform having been given, the breast and tumor were removed by two elliptical incisions. On cutting into the tumor it was found to be a simple cyst full of fluid.

The patient did well after the operation, and left the hospital convalescent.

The preparation is in the Guy's museum, No. 2290[80].

Case XIII.—Sero-cystic disease of right breast; removal of lobe; inflammation of the remainder, and recovery.

Mrs. S., a childless, married woman, aged 50, was brought to me by Dr. Wallace, of Hackney, March 15th, 1875, with a tumor in the axillary lobe of her right breast, which had been steadily increasing for three months. The tumor was hard and lobulated, and I supposed the growth to be simple, and advised its excision.

March 21st. On excising the tumor I found it to be made up of cysts, and in making the section of the gland the whole breast was found to be full of small cysts (involution cysts), many of which I punctured. I could not remove the whole gland, as I had undertaken to remove the tumor alone.

During convalescence the remainder of the gland inflamed and indurated, putting on the clinical features of acute cancer. The induration, however, subsequently entirely subsided and the patient recovered.

In 1881 she was quite well.

The tumor on removal was made up of cysts of various sizes, the largest being about the size of a walnut. The cysts

contained fluid of different kinds. In some it was clear, in others blood-stained, whilst in a few it was mucoid and greenish. There were no intracystic growths. Some of the ducts were open, and through these bristles could be passed.

The gland was clearly undergoing cystic degenerative changes, and in the lobe removed these changes had gone on rapidly.

Case XIV.—Sero-cystic disease of breast following injury; excision of gland; patient well six years later.

Miss D., aged 34, patient of Dr. S. Tayleur Gwynne, of Whitchurch, Salop.

In June, 1864, she had a blow upon her left breast, which was followed by pain for two months, and then the appearance of a swelling.

In January, 1865, when I saw her, the swelling clearly occupied the sternal half of the gland, and was tense, giving the idea of a cyst. General health good. By December of the same year the tumor had increased, and had become lobulated; it, moreover, was more painful. Nipple and lymphatic glands normal.

December 29th. Breast removed and found to be a pure cystic disease of the gland. Cysts contained brown thin fluid, some clear serum. No intracystic growths.

Rapid recovery ensued, and six years later the patient was well.

Case XV.—Sero-cystic disease of breast; excision of breast; patient well six years subsequently.

Mrs. R., aged 40, the mother of seven children, was brought to me by Dr. Wilton, of Sutton. Her left breast has no nipple: it had been destroyed by old ulceration. The right breast is the seat of cystic disease, which involved the whole gland, and had been going on for months. The gland was very large, with an irregular outline, and clearly contained cysts of all sizes. The nipple and skin over the breast were normal.

January 29th, 1881. Breast removed, and the operation was followed by a good recovery. The gland was full of cysts of all sizes, which contained a great variety of fluids. No intracystic growths could be found.

January, 1882. Pregnant. Natural delivery. Left breast strapped. No nursing trouble.

1887. This patient is now well.

Case XVI.—Sero-cystic disease of breast; excision of breast; patient well eleven years later.

Mrs. S., aged 39, the mother of three children, all of which she had nursed without trouble, the youngest being fifteen years of age, was brought to me by Mr. Joseph Burton, of Blackheath, in 1876, with an irregular nodular tumor in her left breast, which had been coming on several months. It was apparently cystic, and involved the whole gland. The skin over the gland was normal. Her mother had had cancer of her breast, and the sister some internal tumor.

February 16th, 1876. Breast removed. On section a large cyst without intracystic growth, containing fluid as dark as ink, was found, with many smaller cysts containing fluid of different characters. In fact, the whole breast was full of cysts of different sizes. A good recovery ensued; and in 1887, eleven years later, the patient was well.

Group III.—Cystic Tumors of the Breast of whatever kind in which Papillomatous, Adenomatous, Sarcomatous, or Carcinomatous Intracystic Growths are Present.

If, clinically, simple cystic tumors of the breast are fairly common, pathologically they must be pronounced to be comparatively rare, for it is, I think, indisputable that in the majority of cystic tumors of the breast, of whatever character, of duct cysts, gland cysts, or connective-tissue cysts, some solid element can usually be found proliferating from their lining walls, either in the shape of a small sessile or pedunculated outgrowth, or of a solid tumor composed of glandular, epithelial, or connective-tissue elements; the nature of the growth being determined by the seat and persistency of the local source of irritation which originated the formation of the cyst. When the cyst is single the growth will of necessity involve it alone. When multiple, some of the cysts may be simple or non-proliferating, while others are proliferating, the association of the two kinds in the same gland being not uncommon. The surgeon consequently meets with cystic tumors of the breast, in which in one case papillomatous growths are present; the papilloma being a simple outgrowth of the cyst

wall, in the same way as the same growth may spring from the nipple or other structure; while in another case the cyst may have an adenoid growth hanging or springing from its walls, the growth appearing either as a pedunculated intracystic growth washed with the cyst contents, or the cyst may be filled with sarcomatous or adenoid tissue either of a loose or more solid structure; the tumor in the latter case, when the cyst is full, losing much of its cystic character and approaching the more solid kind, whilst the intermediate conditions between these two extremes suggest and give support to the view which some pathologists entertain, that these solid adeno-sarcomatous or fibromatous tumors as a rule originate in cysts, and only differ in the degree in which the cyst cavity is filled.

In many cases, doubtless, what appears to be an intracystic growth is nothing more than a growth originating in the connective or glandular structure outside the cyst, but projecting into it, and having its surface bathed with fluid, the fluid being either the secretion of the cyst wall or an exudation from the growth itself into the cyst cavity. The same remarks are also applicable to sarcomatous and carcinomatous tumors. Without doubt a large number of tumors of the breast begin as cystic, and pass on to become sarcomatous and carcinomatous; the connective-tissue element in the former case, and the epithelial element in the latter, so increasing and filling what was at one time simply a cyst or cysts, as clinically to form what is now known as a cystic sarcomatous, cystic adenomatous, or cystic carcinomatous tumor. These varieties in the cystic disease maintain the same clinical features as characterize the more solid kinds; the symptoms of the solid and the cystic being the same in each, with the addition in the latter of the cyst element. The diagnosis of a cystic adenoma, cystic adeno-fibroma, sarcoma, or carcinoma is consequently to be determined by the same points as are known to characterize a solid adeno-fibroma, adenoma, adeno-sarcoma, or carcinoma, with the addition of such clinical symptoms as are clearly referable to the existence of cysts.

The following cases will best illustrate the clinical features of the disease.

Case XVII.—Cystic (duct) adenoma of breast; excision of lobe.

Mrs. D., aged 45, the mother of four children, the youngest of whom was eight, and who had only nursed her first child, consulted me in April, 1876, for a tumor in her right breast, which had been discovered six weeks, and had steadily increased. I took it to be a cyst. The swelling was central and very cystic to the feel. The nipple projected more on the right than the left side, and discharged blood-stained serum. The skin over the gland was healthy and the lymph glands were natural. I advised puncture or incision, and excision if the cyst was found to contain growth. The late Mr. Jardine Murray, of Brighton, operated in May, 1876, and found a pedunculated intracystic growth, which, on examination, I proved to be an adenoma. He then excised the affected lobe, and a good result followed.

Five years later this lady was well.

Case XVIII.—Case of cystic adeno-fibroma of the breast, in a woman, aged 71; excision of gland; cure.

Catherine K., aged 71, a healthy-looking woman, the mother of three children, was admitted into Guy's Hospital, under the care of Mr. Bryant, on August 7th, 1865. She had always enjoyed good health, and had been able to suckle her children. About last Christmas, some time before admission, she accidentally discovered a lump, the size of an egg, in the outer side of her right breast; it was painless, and grew very slowly for three months, when it suddenly began to increase rapidly in size, and to cause pain. She applied to Mr. Bryant for relief, and remained under his care till she was admitted. On her admission the right breast presented a large tumor, the size of a cocoanut, closely connected with, if not in, the breast. It was irregular in its outline, and evidently in parts made up of cysts, for, in its projecting portions, distinct fluctuation was clearly felt. There was, however, much solid matter. The tumor was quite movable, and the skin over it was only stretched; the axillary glands were also healthy; the nipple was natural.

Nothing but excision promising to be of any use, the operation was performed on August 30th, and a rapid recovery took place, the old woman leaving the hospital in one month perfectly well.

On examining the tumor it was found to be made up of a firm solid material, which contained several large cysts. These cysts held a blood-stained glairy fluid, and in parts the solid growth seemed to threaten to degenerate and break up.

The tumor measured seven inches by six; it was very firm in its consistence, and to the eye appeared of a sarcomatous nature; it was tough, and was with difficulty broken down; in parts, however, it had more the aspect of the looser kind of adenoid tumors.

By the microscope, the opinion formed by the naked-eye examination was confirmed, for the structure generally was an admirable specimen of the more fibrous kind of adenoid tumor; tubes were here and there visible, and also well-developed cell structures, as a drawing by Dr. Moxon indicates.[37]

As an example of an adeno-fibroma in an old woman, the case must be regarded with great interest.

Case XIX.— Cystic sarcomatous disease of the breast of fifty years' growth in a woman seventy-three years of age.

E. C., a healthy-looking old woman, 73 years of age, came under my care on October 5th, 1862, with an enormous tumor, the circumference of a soup plate, in her left breast. She was a married woman, the mother of one child, who was fifty years old. During her pregnancy with that child, she observed a small lump in her left breast, which was movable. This gradually increased in size, but in such a painless way, that she kept her trouble to herself; about three months before she came to me the tumor burst and discharged much blood-stained serous fluid; it was on this account alone that she sought advice. When I saw her a large bossy tumor occupied the position of the left breast; it was fluctuating in parts, and the skin over it was healthy, though much thinned. The nipple was flattened out over it. At one part the skin had ruptured, and the rent appeared as a fissure, with a thin but healthy margin, and through this opening sprouted a large fungating growth. The absorbent glands were natural, and the patient's health was good. No operation was sanctioned.

Case XX.—Cystic (duct) adenoma of breast, excision of gland. Patient well six years later.

Mrs. T., aged 54, the mother of several children, all of whom she had nursed without trouble, consulted me in October, 1880, for a tumor of her breast which she had noticed for

about a year. The appearance of the tumor had been preceded for months by the discharge of a serous fluid from the nipple. .The tumor was about the size of a tennis ball, hard and globular; pressure upon it caused blood-stained serum to flow from the nipple. The skin over the swelling was natural, and the nipple was not changed. The diagnosis of a duct cyst was made, and an incision advised into the tumor with the view to an excision should an intracystic growth be found. This was performed on October 23d, 1880, and the breast removed, as a pedunculated intracystic growth was found in the cyst (Fig. 8). A good recovery ensued, and the patient was well six years later.

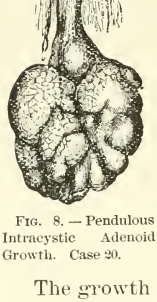


FIG. 8. — Pendulous Intracystic Adenoid Growth. Case 20.

The growth was examined by Mr. Symonds, who reports:

The growth was one and a quarter inches in diameter, and was attached by a small pedicle to the smooth wall of the cyst in which it was enveloped. It had a deep purple-red color, was soft, and separated easily from its attachment. Round the cyst and in its wall were many dilated ducts, some of large size, but no direct communication could be traced. The cyst appeared to be produced by dilatation of a duct. Nowhere in the breast was there any other growth.

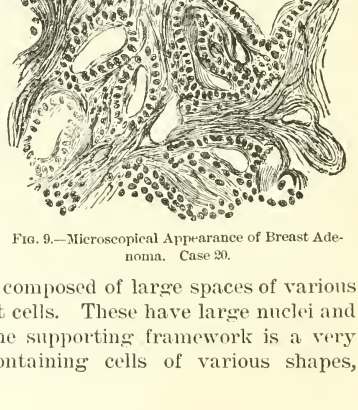


FIG. 9.—Microscopical Appearance of Breast Adenoma. Case 20.

The tumor had a lobulated appearance, as exhibited in Fig. 8, and its pedicle was small; microscopically the growth showed all the characters of a pure adenoma as seen in drawing (Fig. 9). It is composed of large spaces of various shapes, lined by closely set cells. These have large nuclei and one or more nucleoli. The supporting framework is a very delicate fibrous tissue, containing cells of various shapes,

besides blood-vessels. From the walls of many acini conical projections grow, which often blend with the opposite wall.

The tumor therefore appears to be a pure adenoma growing from the wall of a duct. The small amount of fibrous tissue, and the normal characters of the breast tissue immediately round the cyst, negative the view that it is a fibroma budding into a dilated duct. This growth is identical with that called now a "duct papilloma."

Case XXI.—Cystic duct tumor with pedunculated adenocele of breast; excision; patient well three years later. (Reported by Mr. W. T. Crew.)

Susannah W., a single woman, aged 43, was admitted under Mr. Bryant's care, into Lydia ward, on February 2d, 1876, with a globular tumor involving the whole of her right mamma, and extending into the axilla, on the inner side of which there were little hard nodules like peas. The tumor within the breast gland was freely movable under the skin and over the pectoral muscles; the veins were distended over the tumor. Fluctuation was very distinct over the greater part of the swelling; there was no discharge from the nipple, and the lymphatic glands were unaffected.

In 1872 she first noticed an exudation from her nipple like glycerin; soon after, a lump the size of a walnut appeared in her breast without pain, and the swelling increased. The breast would sometimes feel tense, but became relieved as soon as the discharge took place. For six weeks there had been no discharge.

February 3d. The patient having a little cough the operation was deferred until the 8th, when chloroform having been administered, an elliptical incision was made, and the whole tumor, with nipple and a portion of the skin, were dissected out and removed.

The tumor was mainly composed of a cyst which contained about half a pint of mucoid fluid, and was lined by a thin, delicate, white membrane; attached to its walls were several lobulated pedunculated tumors as seen in woodcut (Fig. 10). The growth examined showed a well-marked papillomatous structure. The processes are covered by long columnar cells, and often divide. Circular or elongated apertures lined by the same cells are also numerous. There are also small cysts with definite fibrous walls and colloid contents.

The growth closely resembles that in Mrs. T.'s case, No. XX., and suggests that the large cyst in this instance is also derived from a duct. The small cysts in this growth have been formed, I suppose, by the fusion of the processes in the manner described by Wilson Fox. Several small adeno-fibromatous tumors were also found on making sections of the gland in other parts of the breast. The arteries were twisted, wire sutures inserted, pressure was exerted by pads of lint, and the whole wound drawn together by strips of strapping.

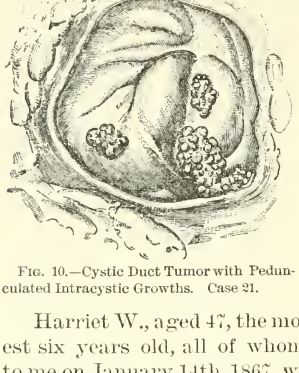


FIG. 10.—Cystic Duct Tumor with Pedunculated Intracystic Growths. Case 21.

21st. The wound has healed by first intention.

Three years later the patient was well.

CASE XXII.—Cystic duct adenoma: excision of tumor; cure.

Harriet W., aged 47, the mother of thirteen children, youngest six years old, all of whom she had suckled, was brought to me on January 14th, 1867, with a globular tumor, apparently cystic, in the upper part of her left breast, which she had observed six months. At first she had a clear discharge from the nipple, but she had not had any lately. The skin over the tumor is apparently bound to the growth. Axillary glands sound.

September 15th. Serous discharge from nipple very free; increased by pressure. Tumor large.

March, 1868. Tumor removed and found to be composed of a cyst, with intracystic pedunculated growth, which was pronounced by Dr. Moxon, after microscopical examination, to be adenoid.

CASE XXIII.—Duct cyst of the breast, following a contusion; intracystic fibro-cellular growths; rupture of cyst seven years later; removal of breast; recovery; patient well twelve years later.

In 1860 Mr. Birkett saw a lady, aged 45, who for seven years had had some tumor in her right breast. In 1853 she received a blow in the part, which was followed by a flow of

blood from the nipple. Two months later an abscess formed, and was opened, a cupful of matter escaping. The abscess healed, but some hardness remained, and occasionally a bloody fluid oozed from the nipple. At times half a pint would flow daily.

Subsequently a soft tumor formed and grew, and the nipple retracted; and two weeks before consulting Mr. Birkett the skin over the tumor ulcerated, and a quantity of blood and fluid escaped. When seen, a soft, vascular, flocculent growth, very like everted mucous membrane, projected slightly from an opening in the integument, with which, however, it was not connected, and from which serous discharge flowed. There was no pain. The nipple, which had been inverted, was now everted. The axillary lymphatic glands were tender, but not infiltrated. Her general health was good. The whole breast was removed, and a rapid recovery followed. The patient twelve years later was well.

A section through the disease exposed a cyst, with firm fibrous walls, imbedded in adipose tissue. Three pedunculated masses of soft, vascular new-growth were hanging from the cyst wall. From the nipple a bristle was passable along a duct into the cyst. The intracystic growth was composed of fibre tissue, nucleated bodies of variable shapes, and a reticular stroma with an arrangement like papillæ or villi. The true gland tissue was nowhere visible.

Case XXIV.—Cystic duct sarcoma of the breast which never secreted milk.

Mrs. G., aged 45, the mother of one child, aged 17, consulted me in February, 1881. She had suckled with her right breast, but not with her left, because she had no milk in it, and the nipple was retracted. For six years she had had a discharge of a clear fluid from the retracted nipple of the left breast, and which at the catamenial periods was increased; the fluid at times was like "treacle water." Three months ago this flow stopped and a lump appeared.

A tumor the size of a walnut exists in the centre of the breast beneath the nipple. There is no discharge from the nipple. I advised incision and excision if necessary. Dr. Godfrey, of Balham, subsequently tapped the cyst and discovered a growth, the excision of which was advised, but not acceded to.

Case XXV.—Cystic sarcoma of the breast fourteen years; removed; well seven years later.

Mrs. B., aged 42, of Bottesford, Nottingham, consulted me in 1877 for a tumor in her left breast of fourteen years' duration. She was the mother of four children, the youngest being four years old, all of whom she had suckled. At the birth of the last child, four years ago, the tumor was no larger than an egg. For the last six months it had grown rapidly, and is now as large as a fist. It is clearly cystic from its nodular shape and fluctuating feel. There is no discharge from the nipple. No lymphatic glands are enlarged. Excision was advised and performed, and a good recovery followed. In 1884, seven years after the operation, the patient was well. Her maternal grandmother had died from cancer of the tongue, and her paternal grandmother from cancer of the breast.

Case XXVI.—Cystic sarcoma of the breast; retracted nipple; excision; well eight years later.

Mrs. S., aged 50, the mother of nine children, one only of whom she suckled without difficulty, consulted me in March, 1876, for a tumor in her breast, which had been steadily increasing for two years. Eight of her children had died of phthisis at ages varying from fifteen to twenty-seven. When seen the tumor was the size of a fist, smooth, slightly lobulated, globular, and elastic; it appeared to be cystic. The nipple did not discharge, but was retracted. The axillary glands were free.

April, 1876. It was excised by Dr. Sams, of Blackheath, who sent me the specimen.

April 11th, 1876. Dr. Goodhart reported: "The tumor is spindle-cell sarcoma or recurrent fibroid, as I expected from its lobulated appearance and manner of growth. They are not at all uncommon in the breast, and are often called adenoid growths from their very similar naked-eye appearance. It will probably return in the cicatrix, though glands are less likely to be involved in the axilla."

In 1886 this lady was still well.

Case XXVII.—Cystic sarcoma of breast; rupture of cyst; hemorrhage; excision; recovery.

Mrs. S., aged 71, consulted me in January, 1873, for a tumor of the breast of twelve years' growth. It was then the

size of a child's head. One cyst had ruptured, and an intracystic growth sprouted from its centre which bled freely. On this account an operation was advised, and performed on February 26th, 1873. A good recovery ensued. The disease was on examination found to be one of cystic disease, with intracystic sarcomatous spindle-celled growths. This lady died, more than three years after the operation, in September, 1876, from acute bronchitis.

Case XXVIII.—Cystic duct adeno-sarcoma of the breast of several pounds weight, as indicated by free discharge from the nipple, into which hemorrhage had taken place; excision; recovery.

Mary A. W., a healthy-looking single woman, aged 20, came under my care March 26th, 1861, with a tumor in her right breast which had been growing for three years and a half. It had commenced as a swelling the size of an egg, which was situated in the centre of her breast, and had steadily increased without pain. When coming under observation the tumor was of the size of an orange, globular and tense. I diagnosed it to be of cystic origin. She disappeared from view for eighteen months, and when she reappeared the tumor measured fourteen inches in diameter and twenty-two inches in circumference. It was globular, with the nipple in the centre; quite movable with the breast, and uniformly elastic; fluctuation was readily to be detected in it. The skin was much distended over the tumor, and on its outer side it was red and inflamed from distention. The breast gland could not be separated from the tumor.

The tumor during the interval mentioned above had grown slowly up to six weeks, when its increase became rapid. For three weeks there had been a free discharge of a bloody fluid from the nipple, which could be readily squeezed out by pressure upon the tumor.

On March 15th, I tapped the tumor, and let out a quantity of bloody serum and broken-down blood; to allow of its more ready evacuation the opening was enlarged, when the finger, without force, easily broke up a large portion of the growth. Two and a half pounds of this material were thus taken away. The largest portion of the tumor was, however, of a more solid nature, which necessitated the removal of the whole gland. This was done, and a good recovery followed.

A section of the tumor through its centre and the nipple showed a fine example of cystic sarcoma of the breast. At its lower part were many beautiful examples of intracystic adeno-sarcomatous growths, which turned out of their cyst walls. About the centre of the tumor were smaller growths, infiltrated with blood, and breaking down; and in the upper part there was little else than extravasated blood and clot. Microscopically, all the elements of sarcomatous tumors were present, spindle-cells being abundant; there were, too, some glandular elements such as are found in adenoma.

Case XXIX.—Cystic sarcoma of the breast; rupture of cyst; operation refused.

Clara W., aged 43, the mother of three children, the youngest being fourteen years old, consulted me on March 7th, 1867, for a tumor the size of an orange in her left breast, which had been growing thirteen months. It was globular, semi-elastic, and nodular. The skin, nipple, and axillary glands were sound.

April 7th. Tumor much larger; its bossy surface is lost, and the growth seems to be one large cyst. Cyst tapped, and about one ounce of blood-stained fluid drawn off.

June 2d. Tumor size of cocoanut.

July 8th. Tumor burst and discharged fluid largely mixed with blood. Operation refused. Intracystic growths visible; later on some of the growths projected through the rupture in the cyst wall.

July 16th, 1868. Patient sinking from asthenia and bleeding from the growth.

Case XXX.—Cystic sarcoma of breast; rupture of cyst; operation rejected.

Mrs. R., aged 63, married at age of twenty-one and had five children, the youngest aged thirty. Nipple in left breast always retracted. Thirty years ago, independently of nursing, she had a tumor the size of a fist in her left breast, which disappeared after one year. She remained well for twenty-eight years, up to one year ago, when the swelling reappeared in the same breast, and this has gradually grown.

At present (July 9th, 1873) a tumor the size of an egg exists in the upper part of the breast, which seems to be a cyst; this is adherent to the skin. Excision of the tumor was advised but not accepted.

January 19th, 1874. The cyst, which has much increased in size, has ruptured and discharged its contents, a sarcomatous growth protruding from the skin opening. No operation was sanctioned.

Case XXXI.—Cystic sarcoma of breast; suppuration of a cyst followed by rupture of cyst; no operation.

Mrs. C., aged 43, of Hull, the mother of five children, her youngest child being now fourteen years of age. After giving up nursing there was discharge from her nipple of a clear greenish or blood-stained fluid. Six months ago this discharge ceased, and the breast enlarged, inflamed, and suppurated. It was opened at that time by Mr. W. H. Rudd (April, 1883), and the abscess healed, leaving a lump. This increased in spite of treatment, and is now the size of a large egg. It appears to be (February, 1884) cystic. Incision into the cyst was advised, and excision of the lobe advised if growth was found. Nothing was, however, done, but the cyst burst and discharged bloody fluid, and discharge has been going on up to the present (October 12th, 1884).

Case XXXII.—Cystic sarcoma.

Mrs. S., aged 70, has had three children, which she never suckled. In 1875 she consulted me for a tumor in her right breast, which she had had four years; when seen by me it was the size of a cocoanut, clearly cystic, and nodular. No lymphatic glands were enlarged. Skin normal. Operation not advised on account of age.

Case XXXIII.—Cystic fibroma of right breast, with cystic degeneration of the gland; excision of tumor; cured. (Reported by Mr. Metzgar.)

Rebecca B., aged 40, was admitted into Lydia ward on June 21st, 1884, under Mr. Bryant's care. Patient's father and two brothers died of phthisis, and she frequently suffers from bronchitis and neuralgia. She is married, and has one son alive and healthy. Six weeks ago she noticed an uncomfortable swelling in her right breast, which appeared as a prominent tumor in the upper half of the gland. This tumor has not increased much since then, but it has seemingly got softer.

On admission. The tumor is hard and nodulated, firmly imbedded in the gland, but freely movable with it upon the pectoral muscles. The skin over it is normal. The axillary glands are not enlarged. Nipple natural. Urine normal.

June 24th. Under chloroform an oblique exploratory incision was made into the tumor. The tumor, when incised, appeared granular and fibrous, a fibroma apparently growing from or into a cyst; the breast itself had undergone cystic degeneration. The tumor was then freely separated from the surrounding breast tissue and removed. In so doing black cysts were seen spread over it. The vessels having been twisted, and capillary hemorrhage stopped by hot iodine sponges, three silk sutures were put in, and one and a half inches of drainage tube were inserted into the upper and left end of the incision, the lower or right half being well padded with lint and a sponge. The arm was strapped to the side.

June 25th. Drainage tube removed.

30th. Stitches removed. Lips of wound drawn together with waterproof strapping.

July 11th. There has been good primary union. There is very little discharge. A plug of terebene lint into the lower and right end of the wound.

26th. Went out, to come up from time to time to be seen. This patient was subsequently quite well.

The tumor when removed proved to be a fibroma growing from the walls of a cyst. The gland itself was full of small cysts, the result of degeneration.

The temperature only on three occasions after the operation reached 100°.

Case XXXIV.—Recurrent mammary cystic sarcoma; excision; well. (Reported by Mr. H. H. Wright.)

Eliza M., aged 36, was admitted into Lydia ward on July 14th, 1880, under Mr. Bryant's care. Patient is a married woman, and the mother of eight children. Three years ago she was operated upon for tumor of the left breast; the tumor was removed, but the breast was left. She has since been able to suckle a child at the same breast. A year ago she noticed a small lump above the nipple, which has steadily increased. On admission there was a large lobulated tumor involving the whole of the left breast, but divided into two chief parts. One of these occupies the central and upper part of the gland; the other, which is smaller, is placed on the axillary side. The whole tumor is above the level of the old cicatrix. It is freely movable, partly hard and partly elastic

to the touch. One point above and to the inner side of the nipple is inflamed and painful.

July 20th. Under an anæsthetic the whole breast was excised.

The patient suffered a little from conjunctivitis after the operation, but otherwise did well, and on August 16th went out, the wound having healed.

Description of Tumor.—The tumor was everywhere encapsuled. It was composed of many lobules, separated from one another by fibrous septa, and each inclosed in a capsule. Some of them grew into thin-walled cysts containing little or no fluid, their walls being in contact. The growths in these cysts were in some cases lobulated finely on the surface. In a few, they resembled in color and smoothness a mucous nasal polypus, but were in consistence a little firmer. The majority of the lobules showed on section a finely lobulated appearance, the outlines of the little lobules being crenulated, and some having a distinct cavity in the centre. No communication could be traced between the various cysts, nor could any be traced directly to the nipple. Some parts of the growth were hard, firm, and fibrous. There were no blood cysts, nor any of the translucent-looking material so common in a sarcoma. In some of the nodules (felt elastic during life) there were many elongated slit-like spaces with smooth walls, the surrounding material being acinous.

Histologically the tumor was composed of spindle cells and gland elements (adeno-sarcoma).

Case XXXV.—Cystic (duct) sarcoma of right breast; early symptom hemorrhage from nipple; amputation. (Reported by Mr. Phillips.)

Eliza A., aged 45, a governess, was admitted into Lydia ward on January 8th, 1884, under Mr. Bryant's care. Patient was delicate, but never had any particular disease. Breasts have been always tender, but no history of injury. Menstrual periods regular.

In January, 1883, one year before admission, patient first noticed a pale brownish discharge from the right nipple. It lasted three months, and was increased during her menstrual periods. In March she noticed a lump, the size of a small marble, on the upper and inner part of her right breast. This increased visibly during her menstrual periods. About two

months ago it began to grow, and since then her menses have been irregular.

On admission. Patient is a florid-looking woman, and apparently healthy. The upper and inner aspect of the right breast is occupied by a "firm but not hard" lump, measuring $2\frac{1}{4} \times 1\frac{1}{2}$ inches, and with the longest axis vertical. The lump is painful. There is no fluctuation. The skin is not very movable upon the growth. A hard cord can be felt running down from the growth to the nipple. During pressure upon the tumor a few drops of serous fluid mixed with blood came from the nipple. Under the microscope this fluid was found to consist of blood-corpuscles forming roulcaux. A small gland the size of a nut exists in the axilla.

The breast was removed, and found after removal to have been the subject of cystic degeneration of the gland. Into some of the cysts sarcomatous growth of the spindle-celled variety existed. Plate IV., Fig. 9, was taken from this case.

19th. There was primary union all down the wound except at its lower part. The uppermost stitches were taken out.

26th. Drainage tube taken out.

February 1st. There is perfect union of wound.

9th. Discharged well.

The temperature ran a normal course throughout.

Case XXXVI.—Cystic adeno-sarcoma of breast; excision.

Miss C., aged 46, consulted me on July 10th, 1885, for an affection of her left breast, which had been coming on for about six months, and was accompanied with some pain. The whole gland seemed to be indurated and enlarged, and to the hand felt coarse and nodulated; below the nipple a hard mass was felt. The nipple was natural, and discharged a blood-stained fluid, more particularly after manipulation. The skin over the breast was natural, and the lymphatic glands were not enlarged.

On July 11th the breast was excised, and a good recovery ensued.

To the eye the breast was clearly undergoing cystic degeneration, the whole gland being full of small cysts. In one lobe these cysts had much increased, and one of them contained an intracystic growth. The cysts had evidently a connection with the ducts, since during life there was a nipple

discharge, and after the removal of the gland fluid could be squeezed out of the nipple.

Mr. Symond's report on the case is appended.

Report of Case by Mr. Symonds.—The breast was found to contain a large cyst in the tissue just beneath the nipple, measuring one inch across. Projecting into one end of the cyst was a rounded solid growth, with an uneven papillomatous-looking surface. This extends beyond the limits of the fluid-containing portion of the cyst as a solid cylinder, round which the cyst wall is closely fitted, so that in a transverse section the appearance is much that of a large vein filled with a growth. The section has a whitish-gray color. No other cyst of any magnitude was seen, but there were many small ones. The rest of the breast looked fairly healthy. The tissue was hard, but no definite tumor was visible.

Microscopic Examination.—The solid growth is composed of irregular glandular acini, lined by short columnar cells, with a deep layer of a less regular form. In many places the cells are heaped up, and then are smaller. The stroma is composed of fine fibrous tissue, and contains here and there a cavernous arrangement of vascular tissue. It is very delicate in parts, and forms but a small portion of the whole; in other places, however, especially where the growth is connected with the wall and outlying breast tissue, there is much solid material. This contains much fibre tissue, spindle, and a few myeloid cells, and closely resembles a sarcoma. This solid growth does not form a separate tumor in the breast, for at no great distance from the cyst wall the ordinary mammary tissue is reached. Such a structure as that described might be looked upon as the starting point of the growth, but it forms so small a part of the whole, and reaches so short a distance into the breast tissue proper, that the view seems not so reasonable as the one stated below. The cyst wall is lined with the same short columnar cells.

There are other cysts visible under the microscope varying from a size slightly larger than a normal acinus to $\frac{1}{4}$th inch across. The smallest are evidently dilated acini and ducts. These are lined with rounded or columnar cells, according to their source of origin. The larger ones, of which two or three were found, contain, besides the granules, large round or oval cells with nuclei, and these cysts are lined by peculiar large

cells. They exhibit an intracellular and intranuclear network, have a more or less columnar shape altered by pressure, and large prominent nuclei. They are set directly upon a wall of close fibrous tissue containing elongated nuclei. In places these cells are heaped up and proliferating. They are undoubtedly the progenitors of the large granular cells found in the cysts. Sometimes cells of this character are found filling spaces in the glandular formations, and showing in great contrast to the dark, short, columnar cells, for they are themselves pale, except for the nucleus and granular appearance. In these smaller cysts there are also found glandular growths, connected with the wall. Where attached to the wall there is no solid growth in the neighboring breast tissue.

So far as the description has been carried, it will appear that there is no solid growth except that found in the cysts.

Examining other parts of the breast, it is found that everywhere some change is going on, that there is a widespread activity manifesting itself throughout the entire organ, culminating in the formation of cysts and glandular growths. Again, it must be stated that nowhere is any highly nucleated tissue to be found except on the margin of the large cyst above referred to. The fibre tissue is dense, and contains few nuclei, and everywhere fat is found, so that in all the illustrations adipose tissue, where not sketched, will be considered to be present close to the acini.

The presence of the fat seems a good evidence of the fact that we are dealing with a diffused change in the breast, and not with a widely disseminated tumor, a point insisted upon by Cornil and Ranvier.

The first departure from the normal structure is seen in the acini. The cells are increased in number and obscure the lumen, and the wall shows as a thickeneed fibrous investment, with very few nuclei.

Next several acini fuse together by obliteration of the intervening septa, a process seen in all parts of the breast in varying degrees. The cells are smaller and more irregular than the normal ones. In some places, but this is exceptional, fibrous tissue is produced at the same time, and we have the appearances of an alveolated stroma of fibre tissue, the spaces of which are filled with epithelial cells. In the centre of some

spaces is seen a lumen, while in others the cells have accumulated to such an extent as to obliterate all trace of it.

Such are the various morbid appearances seen in this breast. The sequence of events it is not so easy to arrange, for though there are some small adenomatous growths in cysts, I cannot follow the development of such out of the earlier changes detailed above.

It is important to compare this case with the sketches of the breast from Mrs. T. (Case I.), where a pure cystic change is seen, and with that of Mrs. T. (Case XX.), where a pure adenomatous growth hangs by a pedicle to the wall of a cyst. Whatever view be taken of the sequence of events in this breast, the following conclusions seem justified:

1. That the change is a general one.
2. That there is no new solid formation outside of cysts.
3. That the departure from the normal begins in the epithelium of the ducts and acini, and proceeds either toward cyst formation or fusion of many acini, to one or to both of which changes new formation of gland tissue succeeds.

It may, I think, also be surmised, when we consider the appearances presented by the large cyst in Case I., and the connection between the intracystic growth and the cyst wall in this case, that the glandular formation arises by outgrowths from the cyst wall, and is a pure intracystic growth, and not a protrusion inward of a tissue formed outside the acini and ducts. As in Cases XVII. and XX., the growth may be viewed as an adeno-sarcomatous papilloma.

Case XXXVII.—Cystic sarcoma of right breast; ulceration of skin over it; excision; recovery. (Reported by Mr. H. Dismorr.)

Dora G., an anæmic-looking woman, aged 53, was admitted into Lydia ward on December 16th, 1873, under the care of Mr. Bryant. She had noticed for many years in her right breast a lump, at first not larger than a nut. Her sister, while in bed, had put her elbow on the patient's breast while raising herself up. This gave her a great deal of pain, and the small lump then appeared: it gradually increased in size, but did not trouble her much till about six weeks before admission, when she caught cold, and it enlarged rapidly; the skin broke in two places over two prominent lumps; the bridge between them gave way and united the separated sores; these

increased in size and discharged very much. On admission, the breast was the seat of a tumor the size of a cocoanut, which was somewhat nodulated on the surface; the skin on the inner side of the nipple was red from capillary congestion; on the outside there was an ulcerated surface five inches by four, which was in great part covered by a blackish slough. The edge of the skin, though adherent to the tumor, was not infiltrated by new growth. The glands in the axilla were enlarged, but there was no enlargement of the abdominal viscera, and the other breast was healthy.

On December 23d she was put under the influence of chloroform, and the tumor was removed by two semi-elliptical incisions, with the enlarged axillary glands. The two edges of the wound were brought together and supported by strapping. There were no adhesions of the tumor to the deeper parts. A section of the tumor showed a large single cyst with definite walls, its cavity being filled with sessile growths of a lobulated form, tough consistence, and gelatinous look. The microscope showed it to consist of a loosely fibrillated connective-tissue spindle-celled sarcoma and a larger number of round fatty nuclei scattered through it.

After the operation a morphia injection was given, which greatly relieved the patient, but she was very sick the day after, and perspired freely for some two or three days.

29th. The wound is looking very healthy, and covered with granulations. There has been a little diarrhœa, accompanied by pain in the abdomen. Temperature 98.6°, pulse 78.

January 17th, 1874. The patient has gone on improving; there has been a good deal of perspiration, at night particularly, after which she complained of weakness, but her appetite has been good. Six pieces of skin were transplanted to the wound, four of which seem to have taken. She gets up for an hour or two in the day. The wound decreased in size, and on the 27th was the shape of a triangle, each side being about two and a half inches long.

29th. Eight pieces of skin were transplanted, six of which were thought to have taken five days later from this time. She went on capitally, and left the hospital on February 9th, the wound having lessened in size half an inch in ten days.

This patient was known to have been well three years later.

Case XXXVIII.—Cystic carcinoma of breast; excision.

Miss S., about forty-five years of age, consulted me on December 19th, 1884, on the advice of Mr. Bisshopp, of Tunbridge Wells, for a tumor involving her right breast of more than two years' growth. She was first seen by Mr. Bisshopp in November, 1882, when the tumor had been discovered some months. It was then hard, but painless; it grew gradually. When I saw her the whole breast seemed to be involved in the disease, and was hard and nodular. The nipple and skin over the breast were natural. I regarded the case as one of cancer, and advised its speedy removal. Sir James Paget saw the case and gave a like opinion. On January 9th, 1885, the operation was performed, and the wound healed at once by quick union.

The lady is now (two and a half years after the operation) well.

Report of Tumor by Mr. Symons.—The tumor was situated beneath the nipple in the substance of the breast, and measured about one and a half by two inches. The section when fresh showed a pinkish color, with many yellow spots resembling altered secretion, plugging ducts. There were, besides, many larger spaces with smooth walls filled with a yellowish-gray or darker thick fluid. The tumor was not limited by any capsule, but blended directly with the breast, and in some places with the adipose tissue. When a thin slice was cut and the yellow contents of the spaces removed, the whole closely resembled cavernous tissue, so numerous were the spaces and so scanty the stroma. Examined microscopically in water, the yellow material was found to be composed of cells of all shapes, and in all stages of degeneration, the prevailing shape being an irregular columnar. Numerous fatty granules, and plates and rounded or irregular masses of carbonate of lime also were present.

The microscopical appearances are shown in the drawing below (Fig. 11), made under a low magnifying power. The spaces are of various sizes and shapes, are all of a tubular character, and most of them have a distinct lumen, occupied when fresh by the yellow material above described, and which has nearly all fallen out in the preparation of the section. The epithelium lining these spaces is arranged mostly in a double or triple layer, having a distinct dark line where, uniting, they limit the lumen, an appearance resembling the striated border

of Brücke. In other spaces the epithelium is more abundant, and forms irregular elevations projecting toward the lumen, which is in some instances entirely obliterated. Under a high power this last arrangement closely resembles an alveolus of an ordinary carcinoma of the breast. The stroma is fibrous, with very few nuclei or vessels, differing in these respects markedly from the stroma of new growths generally. The epithelial cells are large, angular, closely fit into one another, and have prominent round or oval nuclei. As they increase in number many become granular and some vacuolated.

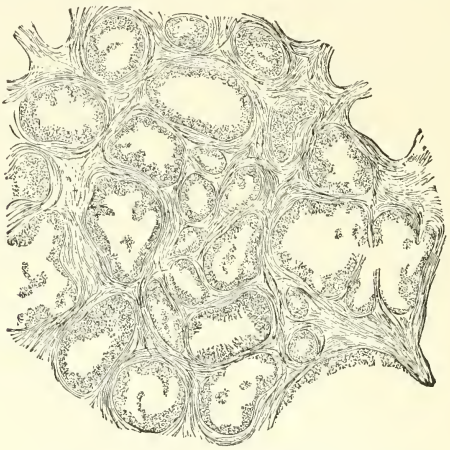


Fig. 11.—Tubular Carcinoma of Breast. Case 38.

The growth was not confined to the nipple, but was placed somewhat below this point. Moreover, it invaded the surrounding adipose tissue. On these grounds, and on account of the large size of the tumor, the large number of the spaces, and the absence of any large cysts, the formation must, I think, be considered as no mere duct dilatation, but a new growth, the prevailing character of which is its tubular form. This character is determined probably by the seat of origin, for when contrasted with another case, that of Mrs. T. (Case I.), the absence in all the sections of ordinary breast tissue and fat confirms the view that this is a new formation.

Case XXXIX.—Cystic cancer of breast.

Miss B., aged 43, for ten years has had clear discharge from her left nipple, gluing it to her linen. At times the discharge has been blood-stained; she has had occasional sharp pain in the breast. The catemenia regular.

Seven years ago the lump was the size of a nut; now (April, 1882) it is the size of an orange.

The lymphatic glands and the skin over the breast are healthy. Breast excised by Mr. Shipman, of Grantham, and found to be cancerous.

The growth had clearly grown from a cyst.

Case XL.—Cancer of breast following cystic disease coming on after prolonged suckling.

Sarah C., aged 44, the mother of one child, which she suckled for three years up to six weeks ago, applied to me on April 25th, 1865, for a soft swelling the size of an egg in the outer lobe of her right breast. It was fluctuating, and had been coming two months.

Under tonics the swelling seemed to get smaller, but in June the skin over it became adherent, and in July pus escaped from the nipple.

On August 17th the cyst burst and discharged a yellow serous fluid. The case then did well.

In January, 1866, patient reappeared with the breast generally infiltrated and fixed to the chest; the skin over the breast was likewise infiltrated, and in one spot ulcerated.

At this time the diagnosis of an acute carcinomatous infiltration of the breast was easily made, and from the history of the case it seems probable that it originated within the cyst of which the report gives a history.

Had the cyst been excised when first treated, the cancerous disease might have been prevented.

Case XLI.—Cystic carcinoma of breast following blood cyst; excision of breast; return and death in one year.

Mrs. C., aged 58, nursed eight children without trouble. Lump in right breast for six months, having been preceded by a discharge from the nipple of blood for one and a half years. When I first saw her on May 5th, 1876, there was a cyst the size of a walnut on the outer side of her right nipple. By pressure all the sanguineous fluid could be squeezed out of it, and the wall of the tumor fell in, leaving a concavity.

Pressure was applied to the tumor by cotton wool and strapping.

November 29th. No tumor can be felt. The hollow beneath nipple is still distinct. No discharge from nipple for three weeks.

July 28th, 1879. After the lapse of three years nipple retracting; some thickening in seat of cyst. No discharge from the nipple; skin slightly infiltrated over seat of old cyst. No axillary glands enlarged.

August 6th. Excised breast; good recovery.

June, 1880. Died with internal cancer.

The interest of this case rests on the fact that for at least four years before any symptom of local cancer appeared there was clear evidence of the presence of a duct cyst. That the cancer developed in the cyst there can be little question, since it was in the seat of the cyst and of the gland over it that the first signs of carcinoma appeared.

It was a source of regret to me when I saw this serious trouble, that excision of the breast had not been performed earlier. The results might then have been different.

Case XLII.—Carcinoma involving a mamma the seat of cystic disease; excision; return five years later.

Mrs. S., aged 42, the mother of one child, consulted me in February, 1876, for a tumor in her left breast which she had discovered four months, and which had steadily increased.

The tumor was situated in the axillary lobe of the gland; nipple natural; axillary glands free. The growth was clearly scirrhous.

Excision.—Axillary lobe infiltrated with carcinomatous material and simple cysts in other parts of the gland, one filled with inky fluid; no intracystic growths.

Good convalescence.

Remained well for nearly five years, that is till December, 1881, when signs of return of cancer appeared in the cicatrix.

Case XLIII.—Cystic carcinoma of breast following upon ordinary scirrhus.

Ann C., aged 60, came under my care in July, 1864, with an infiltration of her right breast. Three months later the skin over the gland became adherent and infiltrated, and the axillary glands enlarged.

In April, 1865, a cyst appeared in the upper part of the

tumor, and rapidly increased, so much so that in July it threatened to burst. This, however, did not take place. In September chest complications appeared which destroyed life.

Case XLIV.—Cystic carcinoma of breast; excision; cure.

Ann C., aged 49, the mother of five children, all of whom she suckled.

For four and a half years she had discharge of blood-stained fluid from the nipple, which could be increased by pressure.

The gland had steadily enlarged during this period.

April 17th, 1865. Breast large and nodular. The skin was adherent to the breast, and the nipple was retracted, the tumor was clearly cystic in its nature. The breast was subsequently excised and the patient recovered. The disease was, as suspected, cystic carcinoma, the gland being full of cysts, and the cysts of intracystic carcinomatous growths.

Case XLV.—Cystic carcinoma of breast; sloughing of growth; hemorrhage; removal; relieved.

Harriet A., aged 70, was admitted into Lydia ward on January 28th, 1879, under Mr. Bryant. She has had four children, the youngest of which is now thirty-five years of age. There is no history of tumors, and patient has always been healthy.

The patient first noticed a small lump in the axillary portion of her left breast ten years ago, and it has continued to increase in size since. On Friday evening last it began to weep with blood.

On admission. The left breast is occupied by a hard infiltrating growth which implicates the skin and deeper parts, extending from near the left border of the sternum to the middle of the axilla, and from the third rib above to a point in a line with the ensiform cartilage. The breast is not distinguishable, and the site of the nipple is occupied by a depressed ulcerating induration marked with dilated vessels; the ulceration is superficial, and covers an area an inch in diameter. External to this is a large, oval, fluctuating swelling, limited above by a deep furrow. The swelling is about three inches by two; the skin over it is thin, red, and livid; about the middle of it is a black spot, from which the hemorrhage took place on the 24th inst. There is no enlargement of the axillary gland.

On the 28th and 29th more hemorrhage.

January 30th. The cyst has collapsed; the skin around the opening is sloughing, and it is discharging a fœtid grumous-looking material.

January 31st. *Operation.*—Two elliptical incisions were made from the median line of the body running obliquely downward and outward, about five inches in length, and three inches apart at the centre. The whole of the breast and carcinoma were removed as far down as the pectoralis major. The wound was washed with warm iodine water, two silver sutures were introduced at the upper angle of the wound, and a piece of terebene lint applied over it with a bandage to keep the dressings in their place.

February 2d. The wound was dressed and the silver sutures removed.

March 10th. The patient was discharged to-day convalescent.

The walls of the cyst after excision on section showed small round cells. The hard mass was evidently scirrhus undergoing fatty degeneration. It was in one large cyst which had ruptured. There were other cysts filled with cancerous growths.

Case XLVI.—Cystic carcinoma of mammæ, with cystic degeneration of breast; excision; relieved.

Mary Ann W., aged 50, was admitted into Astley Cooper ward on June 15th, 1878, with a hard swelling reaching from the nipple upward two inches. The nipple was retracted and the skin was adherent to the growth beneath. The axillary lymphatic glands were not enlarged. Her previous history was good, as was that of her family.

It was only about six months before her admission that she first noticed a little pain in the breast and a dimpling of the skin, beneath which was a small lump. The lump increased in size, and became very painful when touched. She then saw Mr. Bryant, who advised the removal of the breast.

June 16th. Chloroform was administered, and the breast removed. The mass was found to be cancerous, and cysts were found to be freely distributed throughout the gland tissue.

She left the hospital on September 17th convalescent.

Case XLVII.—Recurrent carcinoma of mamma; excision; relieved; carcinoma of cyst.

Jane R., aged 47, a married woman, was admitted into Lydia ward on 15th October, 1877. She was the mother of eight children, six of whom where living, the youngest being fifteen years of age. She had suckled all her children with her affected breast.

She had always enjoyed good health until about twenty months before admission, when she noticed for the first time a little lump in her right breast about the size of a walnut. Ten months later it increased rapidly.

On February 9th she was operated upon at another hospital, and the tumor was removed, leaving the breast and nipple, which were not infiltrated. She left the hospital on March 11th, with the wound perfectly healed.

On admission. The patient stated that about two months after her discharge from the hospital she noticed a slight swelling in the cicatrix of the old wound as well as pricking pains; the growth rapidly increased in size until it became a circular tumor four inches in diameter, a little to the right of the sternum. It was hard to the touch, movable over the pectoral muscles, and infiltrated the skin for three inches. The skin was purple and shining, and had about its centre a small prominence.

October 23d. Chloroform was administered, and the tumor was removed by two incisions, inclosing a space about five by six inches; there was but little hemorrhage. The growth had to be dissected off the pectoral muscles. The incision left a large cavity, into which a porringer without the handle might be embedded. This was left to granulate. One suture was, however, put in at the right-hand side of the wound.

The tumor, when cut into, exhibited a large cavity containing serous-looking fluid. The walls were composed of very soft cancerous growth made up of epithelial elements.

November 16th. There was a small growth, the size of a cherry, noticed to be growing from the bottom of the fossa near the lower and right side. This was thought to be a portion of the old growth left behind after the operation. The following day it was removed. There was very little bleeding and not much pain.

December 12th. She left the hospital convalescent.

Six months later this patient was well.

In this case the evils of a partial operation for carcinoma

are well illustrated, for had the rule which is generally considered by surgeons as a binding one been observed, and the whole breast been removed when the primary tumor was taken away, the second operation would not probably have been called for.

Case XLVIII.—Cystic sarcoma of one breast; removal; followed in nine years by cancer in opposite breast.

Mrs. W., aged 60, the mother of one child, which she could not nurse as her nipples were retracted.

Twenty years ago she had a small lump in her right breast, which disappeared entirely in the course of two years.

February, 1872. Observed a lump in the same spot, which has increased rapidly, so that now (April, 1873) it is the size of a cocoanut. Tumor clearly lobulated and cystic; axillary glands free.

The breast was removed and was clearly cystic spindle-celled sarcoma; a good recovery followed the operation.

June 14th, 1882. A tumor appeared in the left or opposite breast which infiltrated the gland, and gave rise to retraction of nipple and puckering of skin. It was an example of ordinary carcinoma.

Nothing was done, as the patient refused to be operated upon.

This case is worthy of record as an example of a patient having a carcinomatous tumor of one breast follow upon the removal of a cystic sarcomatous tumor in the other, although at ten years' interval. Such cases are rare.

I have, however, now under observation a lady, aged 68, who has had for at least twenty years a perfect specimen of scirrhous carcinoma of the left breast, which has remained unchanged for four and a half years, while in her right she has had a rapdily growing round-celled sarcomatous tumor removed with recurring growths on seventeen occasions, during these years, her general health being perfect. (See Case I., in Chapter XX.)

Case XLIX.—Cystic carcinoma of breast.

Mrs. R., aged 83, the mother of many children, all of whom she had suckled, consulted me on June 27th, 1877, for a cystic carcinoma of her left breast which had been coming on for one and a half years.

The tumor was of the size of an orange, and fluctuating;

skin over it infiltrated, but not the axillary glands; nipple natural.

Maternal aunt had had cancer.

No operation advised on account of age.

Case L.—Cyst in breast becoming the seat of carcinoma; removal of tumor followed by death from secondary growth five years later.

The following case, which occurred in the practice of Mr. Birkett, is a good one to show how a cyst may exist for years in a breast gland before it becomes the seat of intracystic growth. The case is described as follows in the hospital catalogue (Preparation 2,309[5]): represents a portion of the left

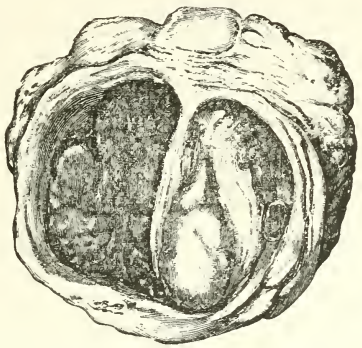


Fig. 12.—Cyst with pendulous Intracystic Carcinomatous Growth. Case 50.

mammary gland, consisting of cancer, which contained cysts. A large cyst (Fig. 12) is seen with a growth attached to its walls. The cyst was filled with bloody serum, and the growth consisted of the elements of carcinoma.

Case of Mrs. B., aged 40, a private patient of Mr. Birkett in 1853. Ten years before, she discovered a lump in her left breast, but suckled with it subsequently, and enjoyed good health. Five months before removal, on May 19th, 1853, the tumor became rapidly larger, and fluctuation could be detected in it. It measured more than three inches across, and occupied the axillary half of the breast.

The patient recovered from the operation, and was perfectly well for two years and nine months. A growth then

formed in the axilla, which ulcerated, and cancer was developed in other organs, and for two years she suffered intensely. She died fourteen years after the discovery of the primary growth. On post-mortem, cancer was found in the left humerus, left femur, and left innominate bone, also on the lumbar vertebræ, and in the liver.

Diagnosis of Cystic Tumors.

In the examination of every tumor of the breast, and particularly of one in a woman over thirty-five, the surgeon as a matter of habit should allow the possibility of the case having a cystic origin to pass before his mind. By so doing he will not only prevent errors of practice which may be grievous, but at the same time he will guard against sources of serious mortification, for, I take it, there are few things more humiliating to a surgeon than an error in practice based upon a wrong diagnosis, when the error is not due to the inherent difficulties of the case, but to a want of care. When the tumor is in the breast of a woman over forty years of age this caution is more necessary, for cystic tumors of all kinds are more prone to occur in women over thirty-five and past the prime of life than in younger subjects. In 1861 I, however, removed a sero-cystic tumor from the breast of a girl aged twenty, which had been growing for three years, and at the time of operation measured twenty-two inches in circumference, and weighed after removal two and a half pounds. This preparation is preserved in the Guy's[38] museum, with another[39] in which a cystic duct sarcoma of one and a half years' growth was removed from a girl aged fifteen. When the tumor seems part of the breast gland itself, and appears as a single or possibly double growth in one or more lobes of the gland; when the swelling is very hard and tense, and is not the seat of pain even when handled; when it has existed for several years, and has given rise to no other symptoms than such as are referable to its mechanical presence, the probabilities of the tumor being cystic are very great. When the swelling is bossy or botryoidal, and fluctuation can be detected in some of its parts; when with the swelling there is a discharge from the nipple, and this discharge can be increased by pressure or manipulation, the diagnosis of cystic disease is

evident, and with the nipple discharge the diagnosis of a duct cyst is clear.

Whether the cysts be simple or proliferous is another question, and if the latter, the nature of the growth they contain is still a third. In a general sense it may be said that a single cyst is more probably simple than when the cysts are multiple and form a polycystic tumor; that is, when a lobule of a gland is expanded by the presence of a single cyst, that cyst is more likely to be of a simple kind than when the cystic disease has involved more of the lobule. Simple polycystic disease of the breast is a rare affection, except as a result of general glandular degeneration. When a discharge from the nipple exists, and that discharge is bloody, the probabilities of a cyst containing some intracystic growth, however small, should be recognized, since it is from the vessels of the intracystic growth that the bleeding as a rule takes place. Simple cysts rarely bleed. When the bleeding is encouraged by or has followed manipulation, the probabilities of the cyst containing an intracystic growth are very great. When a cystic tumor exists in a lobule of the gland as a fluctuating swelling in some parts and a more solid one in others, the diagnosis of solid with cystic growth is tolerably clear; and when with this there is a free discharge of a bloody kind from the nipple, the diagnosis of cystic duct and glandular disease is highly probable. These lobular cystic tumors often present a somewhat typical shape, such as that of a pear, the narrow part of which is represented by the nipple (Plate IV., Fig. 1). Few of these tumors cause pain. Advice is sought as a rule either on account of the tumor or on account of the nipple discharge, not because of pain.

The diagnosis of a cystic adeno-fibroma or adeno-sarcoma is to be made out by attention to the same points as help the diagnosis of these growths when uncomplicated with cysts; that is, a cystic adeno-fibromatous or sarcomatous growth simply troubles from its size or from its nipple discharge. By its growth it expands the integument over it, and spreads out such portions of the breast gland as may be superficial to it, but it in no other way involves its coverings (Plate IV., Fig. 2). The skin may be stretched even to a rupture, but even then the skin as tissue will be neither invaded nor infiltrated with disease. The cysts themselves may even

burst and discharge their contents externally, but under such circumstances the integument that fringes the edges of the ruptured orifice will still be seen free, and can be readily distinguished even from the extruded or extruding intracystic fungating contents (Plate IV., Fig. 3). The nipple may be so flattened out as nearly to be indistinguishable, but it will only in very exceptional cases be drawn in by the disease, as seen so frequently in cancer; and even should it be drawn in, inquiry will generally reveal the fact that such a condition was either congenital, or that some cicatrix of a former abscess had altered its normal shape. Should the cyst be, however, more central and separate the lactiferous ducts, nipple retraction is to be expected.

The lymphatic glands (axillary and clavicular) will rarely be involved; when they are they will be affected actively from lymphatic irritation rather than from lymphatic absorption, and under such circumstances the enlargement is more frequent when the cysts have burst through and irritated the skin than under other circumstances. In some forms of rapidly growing cystic sarcomatous as well as solid sarcomatous tumors, the lymphatic glands are, however, seriously affected.

The diagnosis of cystic carcinoma will turn upon the same points as that of the more common kind of cancer. Though the growth may have orignated in a tube or cyst, it will not long be confined in its capsule, for, obedient to its nature, it will invade its cyst walls and creep into the tissue outside. The tumor will then spread into the neighboring parts by the one marked way in which carcinomatous tumors locally spread, viz., by steady and progressive infiltration or local infection; the carcinoma in its progress having first infiltrated the cyst in which it originated, then the tissues outside the cyst, later on those which surround these, and last of all the integument itself (Plate IV., Fig. 4). The infiltration of the integument first shows itself as a "dimpling" (Plate II.) of the surface, next as a "puckering" of the skin, thirdly as an "infiltration of the skin," and lastly as an ulceration. Should a cyst so enlarge as to encroach upon and infiltrate the skin, and later on rupture through it, the intracystic carcinomatous growth will project and grow through the opening, but the edges of the orifice through which the intracystic growth projects will be found everted (Plate II., Fig. 6), and

involved in the disease, and not, as described in the cases of cystic sarcoma, simply ruptured. The infiltrating tendency of the disease is marked in all its stages from its first to its last. The intracystic growth will never project and fungate in the way of sarcomatous growths. Should the nipple be affected by the disease, it may first be as a conduit for the discharge through the milk ducts, but later on, when the disease has left the cyst and invaded the tissues outside its borders, it will be affected in other ways. When the tumor by its growth has drawn upon the suspensory ligaments of the glands and ducts of the nipple, some retraction of the nipple will ensue, and later on, should the nipple itself become materially infiltrated, there may be actual projection. At times there may be such infiltration and contraction of the tissues around the base of the nipple as to produce œdema of it from blood stasis, and in rarer cases even sloughing.

The lymphatic glands, axillary or clavicular, will become affected in the cystic form of carcinoma as they are known to be in the non-cystic kind, and they will be affected in the same way. In fact, the progress of a case of cystic carcinoma is similar in kind to that of the more solid form of cancer. At the beginning it may possibly be slower, but when the disease has extended beyond the cyst wall or walls, I am disposed to think it is often more rapid.

Prognosis.—A careful perusal of the fifty cases quoted in this chapter (and I have published all of which I have satisfactory records) will lead the reader to form a very favorable opinion of the future prospects of those who suffer from any cystic breast trouble, and have been surgically treated. This remark is applicable to every variety of cystic disease with the exception of the carcinomatous. Where the cyst is simple, a cure can safely be predicted by surgical treatment, which may sometimes be of the simplest kind, such as merely puncturing the cyst and drawing off its contents. Sometimes it may be brought about by a free incision; in exceptional cases by excision. But by whatever means the cyst is abolished, a subsequent cure may be anticipated.

Whether it is wise to leave the disease alone is a question somewhat difficult to answer, but there is no doubt that in the cases recorded in which solid material was mixed with the cystic, the simple cystic element formed the beginning of the

trouble; for in many of the cases a "lump" had existed in the breast for years (associated in some with a discharge from the nipple, which revealed its cystic nature) before any signs or symptoms of the presence of the more solid elements appeared. Under these circumstances it is not unfair to infer that if the simple cyst had not been allowed to remain, but had been treated, the more serious breast trouble which eventually attacked the different patients, and originated in the cyst, would not have manifested itself. If these remarks are applicable to the cases of simple cysts, they are clearly more so to those of a more complicated kind, such as the sero-cystic tumors. The prognosis in these cases after treatment is most satisfactory; indeed, a cure may with some confidence be predicted. In the four cases I have recorded the patients were known to have been well from six to eleven years subsequently, and, in fact, cured.

In the examples of cystic adenoma or sarcoma, the prognosis is no less good; indeed, if I am justified in taking my own cases as examples of all others, I might say the prognosis is very good, for of twenty-one cases recorded, sixteen of which were treated by excision, in no instances was there any known return of the local affection, and six of the subjects of the disease were known to have been alive after the operation for five, six, three, seven, eight, and twelve years respectively; while one died three years after having been relieved of her local trouble, from acute bronchitis. One patient with adeno-cystic sarcoma of one breast had a carcinoma of the opposite breast nine years later.

In cystic carcinoma a hopeful view may likewise be taken, for of my own nine cases which were treated by operation, one was known to have been alive two years, and another five years, after operation; while a third remained well for nine years, when the opposite breast became the seat of an ordinary scirrhus. One other case died one year, and a second four years after operation, from internal cancer.

Treatment of Cystic Disease of the Breast.

In all cases in which the true cystic nature of the tumor is doubtful, an exploratory puncture with a small aspirating needle should be made, not only for diagnostic purposes, but

with the reasonable prospect of retarding if not arresting the progress of the disease, and this hope may reasonably exist should the disease consist of the dilatation of a single duct, for I can recall not a few examples of what turned out to be simple serous cysts of the breast which had been tapped for diagnostic purposes in which, after the lapse of years, no return of the trouble has taken place. When a simple tapping has proved ineffectual or was inapplicable, an incision into the cyst, its free drainage, and healing by granulation, may bring about a cure, but these means should only be adopted when the cysts, on being laid open, have been found quite free from all signs of intracystic growths, and the cyst is single. When more than one cyst exists in a lobe this treatment is hardly applicable, and the safer practice is to dissect out the cysts with enough of the surrounding gland to make it reasonably probable that the disease has been wholly removed. When the cyst contains an intracystic growth it must be freely excised, and should more than one such cyst be made out, the whole gland had better be extirpated, for all proliferating cysts are prone to grow, and the breast glands of such as contain them are rarely only locally implicated. I have, on many occasions, after the removal of a cystic sarcomatous tumor, found such portions of the gland as seemed to be healthy, the seat of the same disease only in miniature (Case XXI.), and this fact fairly suggests that the disease, although palpable in one part and apparently local, is really a general gland disease, and that under such circumstances the whole gland had better be excised.

In the more solid forms of cystic sarcoma and cystic carcinoma, early excision is a rule of practice which should never be deviated from.

CHAPTER XVII.

GALACTOCELES AND HYDATIDS.

Milk or *lacteal cysts,* or galactoceles, are comparatively rare cystic tumors of the breast. They form when the gland is in a state of functional activity, and usually during the first three months of lactation. Exceptional cases are met with which appear at an earlier as well as at a later period. I shall record one which appeared during the ninth month of lactation. Atlee published in the "American Journal of Med. Science" for April, 1874, an example which developed sixteen months before childbirth, and increased rapidly during pregnancy; and Bouchacourt, as recorded by Richelot, has reported an instance which occurred in a woman, aged 51, twenty-four years after her last confinement.

As indicated by the name, the cysts always contain milk, cream, or a buttery material, which is clearly the product of milk; and these variations in the character of the cystic contents are manifestly due to the changes which the fluid undergoes after it has been extravasated into the gland.

At times the tumor follows a blow or some inflammation, but as a rule it appears without any known cause during full lactation. The tumor is doubtless generally due to a rupture of the milk ducts, and consequent extravasation of milk into the connective tissue of the gland, although in some cases it may be caused by the obstruction and subsequent dilatation of a lacteal duct.

In one case the tumor will increase rapidly in size, and Birkett states that it may increase rapidly and distinctly during every time the infant sucks. In another it may appear suddenly, increase slowly, and then, as far as size is concerned, either remain stationary or even diminish, the diminution in size being occasioned by the absorption of the watery constituents of the milk, and its consequent concentration.

With respect to size, cases are on record in which several

pints of milk have been evacuated. Scarpa is reported by Forget to have recorded an instance in which two pints of milk were removed from the tumor; and Birkett gives another from which, after excision, ten ounces of thick cream flowed away.

In the Guy's Hospital museum there is a preparation (2290[80]) of a large cyst which Mr. Birkett removed from the breast of a married lady, 27 years of age, which had been increasing for eight years. The cyst contained fluid composed of milk and serum, and in the walls of the cyst were several small adenomatous growths. It is probable that those growths were secondary to the formation of the galactocele.

At the same hospital (Preparation 2290[50]) there is also a breast removed from a middle-aged patient, for a tumor containing cheesy matter, occasioned by obstruction of a lactiferous tube. A thin translucent membranous expansion exhibits the boundary of the cyst, but all the contents have been removed. The tubes of the gland generally appear dilated, and pieces of glass rod are placed therein. There is no duct at present traceable to the cyst.

The signs and symptoms of this affection are more negative than positive. The one positive sign is the presence of a more or less globular swelling in a breast which is performing its physiological functions with full activity: one that may increase rapidly, or on the other hand, very slowly, and that gives rise to trouble mainly from its size. If it causes pain, it will probably do so from its weight. If it is attended with external evidence of venous congestion, as indicated by full veins, it will be so on account of its size. When the contents of the tumor are liquid, there will be fluctuation. When the fluid has been partially absorbed, and the contents are as it were condensed, the tumor will yield a doughy and peculiar feel. When the contents have become desiccated and a cheesy mass is left, it will present more the physical features of an adeno-fibroma or sarcoma. When it occurs during the period of suckling, and the child is put to the breast, pain is often produced. "The pain and distention (of the cyst) being increased by the draught of milk which enters the breast so soon as the child begins to suck" (Sir A. Cooper).

Should the lacteal cyst occupy the posterior part of the gland, and consequently be covered in front with a thickness

of breast tissue, the globular swelling of the tumor will be obscured, and it may feel nodulated, the coarse, active gland tissue surrounding the cyst giving rise to this condition.

The nipple is not affected in this trouble, although at times it may discharge milk. When this symptom is present during the lactating period it is of no value, but when it exists after the breast has ceased this function, it is of great use; since it fairly shows that the cyst contents communicate directly with a duct, and thus suggests the diagnosis.

At times the tumors are multiple. I have seen two in the same breast. In this case the tumors were of the size of small eggs. They had appeared two years before I saw them, during lactation, and had for one year steadily diminished in size, even to a half, but since then they had been stationary, but felt doughy to the touch, and could be moulded to a degree like clay; that is, the side of one of the tumors could be made flat or convex by pressure. The second tumor could not be so altered, but it was placed more deeply in the centre of a lobe, and had the feel of a fibroma. I cut into both tumors, and evacuated from one what might have passed as excellent clotted cream, and from the other a cheesy material, which represented the cream still more condensed. This case was in a lady about 35 years of age, and the tumors had appeared during the lactation of her first child, two years previously.

A cystic tumor of this kind may therefore decrease in size, from absorption of its fluid contents, and as it decreases become more solid.

Treatment.—These cases, when met with in the months of early suckling, or when that function is in full activity, are not to be allowed to drift, for the milk will not be re-absorbed, and, if re-absorption does not take place, the increase of the tumor may be expected as long as the functional activity of the breast continues. It is wise, therefore, should the swelling be large, to take the child away from the breast with the hope that with the disappearance of the secreting action of the gland, any increase of the tumor will be prevented, and its decrease encouraged: when the cyst is small suckling may be continued. Should this decrease in size not ensue, the cyst should be aspirated and its contents drawn off. Should it then refill and the operation prove unsuccessful, an incision

should be made into the cyst and its contents evacuated. The incision should be a free one, for if a small one be made, it will soon close, and a re-accumulation of milk will take place, or a milk fistula will be left. This milk fistula will last as long a the breast is active, and cease to discharge only when secretion has stopped.

The more chronic cases are to be treated as those of simple cysts, that is, by a free incision, the evacuation of the cyst contents and the subsequent closure of the cyst cavity by granulation. In the case recorded, where solid contents existed, this method of treatment was successful. In the following case, where the fluid was cream-like, a similar result ensued.

Case I.—Galactocele followed by pregnancy and suckling of child from affected breast.

Susan T., 35 years of age, who was confined thirteen months previously, and suckled for ten months, came to me on October 5th, 1865, with a globular tense swelling, the size of an orange, in her right breast, which had been coming four months, that is, from the sixth month of lactation. On November 20th the tumor was punctured for diagnostic purposes, and then freely opened, at least six ounces of cream exuding. A good recovery ensued.

On September 25th, 1866, this patient again came to me when she was pregnant nine months. The breast was then apparently quite healthy. She was confined on October 4th, and suckled well. No breast trouble following.

Case II.—Galactocele of eleven years' standing, suppurating after fourth confinement; treated by free incision and cure.

Annie S., aged 31, the mother of four children, the youngest being nine weeks old, came under my care on April 1st, 1874, with a tumor in the upper part of her right breast, which measured three and a half by two and a half inches in diameter. The skin over the tumor was adherent to it. The nipple was retracted.

Thirteen years before, when only 18 years of age, after a blow, she had pain in her right breast; two years later she married; when suckling her first child she noticed a small lump, the size of a walnut, on the upper part of her right breast. This never left, but after each of her confinements

(four) increased in size. Between the periods it remained stationary. After her last confinement, nine weeks before admission, the lump increased rapidly, became painful, inflamed, and suppurated, some ounces of pus escaping.

She had never been able to suckle with the right breast, as the nipple was too flat.

A galactocele being diagnosed, I made a free incision into the tumor, and turned out a cupful of cream-like fluid, after which the cavity closed and recovery ensued.

Treatment.—The operation required is a free incision into the cyst in a line radiating from the nipple, followed by the thorough evacuation of the contents of the cyst and its perfect cleansing with iodine, or other antiseptic lotion. The cyst should subsequently be plugged with iodoform, carbolic, or other gauze, to promote healing by granulation. The cyst wall might, in very chronic cases, be well sponged with a twenty-grain to the ounce solution of chloride of zinc, or with the pure tincture of iodine before plugging. The wound should be left open to heal from below.

Hydatids in the Breast.

These cysts are found occasionally in the breast gland, as they are known to occur in any other part of the body. How they get there is a question which need not be discussed in these pages.

When such a cyst appears in the breast, it does so as a single, painless, tense, elastic, globular swelling of some portion of the organ unassociated with any morbid condition of the breast gland or nipple, or parts over the breast. It gives trouble merely mechanically by its size. After a period, and, it must be written, a very uncertain period, the hydatid will die, and under these circumstances the parts around will inflame and suppurate: the abscess eventually, if left to nature, opening and discharging; the dead wall of the hydatid in this way escaping. Indeed it is by the escaping of the dead entozoon that the true nature of the case is sometimes for the first time revealed.

These cysts have been found in women of all ages, from twenty-three upward. They grow slowly, at times very slowly; in two of the cases I record the tumor had existed for

eight and eleven years respectively. In exceptional cases they attain the size of an orange rapidly.

They are without doubt difficult to diagnose from cystic disease of the breast, or some neoplasm, and more particularly when they are small. These tumors are, however, always single, and attain a larger size than most cysts; they are never associated with discharge from the nipple. Their true nature can, however, be readily made out by an exploratory puncture, and an examination of the fluid drawn off. The fluid of the hydatid being clear, or very slightly opalescent, alkaline, sp. gr. 1007 or 8, and non-albuminous; whereas the fluid of most, if not all, gland cysts is albuminous. When the characteristic hooklets are found in the fluid the diagnosis of any case is certain. Should the cyst hold a superficial position in the gland, its globular outline will be readily recognized; in the case from which Fig. 8 on Plate IV. was taken, this point is well illustrated. The case was one which occurred in the practice of my colleague, Mr. Symonds.

Case I.—Hydatid of the breast.

Mary A. H., aged 30, a widow, came under my care at Guy's Hospital, in October, 1865, with a smooth, globular, fluctuating swelling, the size of a cocoanut, occupying the upper half of the left breast. She was a healthy woman, the mother of three children (the youngest being eight years old), all of whom she had suckled.

The tumor had been growing for five years, and had appeared as a small, hard swelling, the size of a nut, above the nipple, and apparently deeply seated in the gland. It had grown steadily, although during the last twelve months its increase had been more rapid. It had never caused any pain, and had troubled her chiefly on account of its size.

The tumor and breast seemed to be one, and the gland moved freely over the deeper parts. The nipple was natural, and the skin over the breast was not implicated. There were no enlarged lymphatic glands.

The diagnosis, in this case, was not easy; the swelling was evidently cystic, for all the symptoms indicating a cyst were well marked. The history of the case, and the almost total absence of pain and of all such symptoms as generally indicate suppuration, went far to prove that the swelling was not

due to the presence of a chronic abscess. The nature of the swelling, and the apparently perfect healthiness of the uninvolved portion of the mammary gland, with the absence of nipple discharge, contra-indicated the presence of ordinary cystic disease of the breast. The origin of the swelling, as a small tense tumor, and its gradual and painless enlargement, unaccompanied by any definite symptoms of disease of the mammary gland, were indications enough to excite a suspicion of its hydatid nature, but the extreme rarity of such an affection forbade any positive diagnosis being made.

I therefore punctured the cyst with a trocar and canula, and drew off a few drops only of a thin watery fluid containing flocculi of a delicate membrane, such as was at once recognized as the lining membrane of a hydatid cyst. On this diagnosis a free incision was then made into the tumor, and out came a large parent hydatid cyst, with many daughter cysts. The whole measuring seventeen fluid ounces.[40] Under the microscope, micrococci were clearly seen, and the diagnosis established. The cavity from which the hydatid escaped was left to granulate, and in three weeks the woman was well.

I have given this case in full, with some remarks I made with reference to diagnosis, when I originally showed the hydatid tumor to the Pathological Society on November 7th, 1865, for it contains within itself an epitome of the history and progress of all similar cases, and likewise illustrates the line of treatment which should be adopted for diagnostic as well as curative purposes.

In 1866 a woman was admitted under the care of Mr. Hutchinson, into the London Hospital, for some injury. It was then found that she had been twenty years before in Guy's Hospital for some breast trouble, and that a healthy cicatrix existed on the site of her right breast. Mr. Birkett, to whom Mr. Hutchinson then referred, found that this woman had been in 1846 a patient of Mr. Bransley Cooper, who had removed her breast for a supposed tumor, which turned out to be a hydatid.

The woman when under Mr. Cooper, was a widow of 51 years of age. She had had a swelling in her breast for eleven years, and for eight it had been painless; for the last three years it had caused her inconvenience, probably from its size.

It was about three inches in circumference, firm, and apparently solid. On this account the breast was excised. After its removal its hydatid nature was discovered. The woman made a good recovery.

In the Guy's Hospital museum there is a preparation (2291) taken from a patient of Mr. Cooper Forster's, which supports the points illustrated by my own case. It was removed from a married, prolific, healthy woman, aged 29, in the year 1856, who, six years previously, had observed, when she was only 23 years of age, and while suckling her first child, a small hard pea-like swelling in the axillary lobe of her right breast. It was painless, and had increased slowly. When admitted into Guy's the tumor measured four inches in diameter, and was hard and elastic, but fluctuation could not be detected in it. It moved freely with the breast. Manipulation caused pain. It was explored by an incision, and the parent cyst, containing daughter cysts and limpid fluid, escaped. A good recovery ensued. Fig. 7 on Plate IV. illustrates the case.

Occasionally, as already stated, these hydatids die, and when they do, they excite irritation, inflammation, and suppuration. Suppuration is in a measure curative, since it is the way nature adopts to get rid of its unnatural lodger.

In Prep. 2291[10], Guy's Museum, a hydatid discharged by suppuration may be seen; it occurred in the practice of Mr. Birkett, and I had the advantage of seeing the case, the details of which are as follows:

Case II.—Hydatid in the breast; suppuration; cure.

A married woman, aged 24, was admitted into Guy's in November, 1866, under the care of Mr. Birkett. She looked delicate, but stated that she had always enjoyed good health. She had, four years previously, given birth to dead twins, and had not since been pregnant; suckling, therefore, had never occurred. Eleven months before admission she accidentally discovered "a small lump" on the sternal half of her left breast, which slowly enlarged, but was unattended with pain, until about three or four months since. A month before admission the skin over the tumor became red, the tumor itself became larger, and more prominent; for the first time also it became painful.

When admitted the whole of the sternal half of the left

breast formed a tumor, the skin covering which was red and painful when touched. The outward appearances were those of slow inflammation preceding suppuration, the skin here and there having a purple congested hue. After a few days, fluctuation in the tumor was clearly felt, and the skin began to ulcerate. Four openings altogether appeared, the largest being about half an inch in diameter. Thin, but fairly good pus escaped from the apertures for three or four days, when the nurse, as she removed the dressing, discovered the yellowish-white hydatid membrane, which had escaped from the largest opening in the breast, lying upon the dressing. After the escape of the hydatid the opening in the integument soon healed.

This case is an excellent one to illustrate a method that nature occasionally adopts to get rid of a hydatid cyst. In the present case the cyst was in the breast, but the method of cure would have been the same in other parts. Had the true nature of this tumor been understood, a more rapid cure would have been brought about by a free incision.

By way of summary it may be stated that hydatid tumor of the breast is generally discovered by accident, as a small, hard lump, imbedded in one of the lobules of a healthy adult woman; that it increases, as a rule, slowly and painlessly, and gives trouble solely by its size. As it grows it becomes so identified with the breast tissue as to move with the gland, and to appear as part of its structure. When it has attained the size of an egg, the sensation of fluctuation may be detected in it, and however much the integument may be raised by the tumor it will always maintain its healthy appearance.

At an uncertain period of the cyst's life the tumor will become the seat of a subacute or chronic inflammation which will end in suppuration, with the eventual discharge of the hydatid, and the cure of the case. The period at which this result will ensue is, however, too uncertain to base a treatment upon. From the process employed by nature we can, however, learn our lesson as to treatment, and turn the cyst out of its bed through a free incision as soon as a diagnosis of the case as been made. The cavity in which the hydatid rested will, on its removal, rapidly contract, and a recovery take place.

For diagnostic purposes in this as in the other cystic tumors to which attention has been directed, the use of the exploring

needle cannot be too strongly advocated; for by it, and it alone, can the true nature of the case be at once made known.

Sir A. Cooper originally described these cases, and illustrated them in his work on the breast (1829).

Haussmann, of Berlin, has recently given a good description of them.[41]

CHAPTER XVIII.

A SUMMARY OF THE DIAGNOSIS OF TUMORS OF THE BREAST.

To help the practitioner on the question of diagnosis of a mammary swelling, the following conclusions have been drawn up, which it is hoped may prove of assistance.

1. Tumors that arise during lactation are probably milk tumors, *i.e.*, galactoceles or inflammatory swellings and abscesses.

2. Tumors that are found to be in, but not connected with the breast; that can readily be made out to be distinct from the gland, and moved without causing dragging upon the nipple, are presumably of the benign kind. If they are of slow growth, hard, inelastic, and lobulated, they are probably of the adeno-fibromatous variety; if of more rapid growth, smooth, somewhat elastic, and only slightly lobulated, adeno-sarcomatous; and if hard in parts, and soft in others, clearly fluctuating and bossy, they are probably cystic sarcomatous growths, or colloid.

3. A tumor that infiltrates a lobe or lobes of the breast, which cannot be separated from the gland and has no distinct boundary, is in its nature either inflammatory or cancerous; the lobe or lobes affected being in one case infiltrated with inflammatory products, in the other with epithelial elements.

4. When the affected breast has been physiologically active, or the seat of injury; when the swelling is ill defined and the mammary gland feels leathery, or painful and elastic, and when more than one of its lobes is separately involved, the probabilities of the affection having an inflammatory origin are very great; although when the infiltration has attacked an inactive or obsolete breast, appears as a single tumor, is hard, and nodular, the prospects of the tumor being cancerous are reasonable; and when, in addition to these special local

symptoms, there is either "dimpling," "puckering," or infiltration of the skin over the tumor, or the tumor with the breast is fixed to the deeper structures, the diagnosis of cancer is confirmed.

5. Any globular, smooth, tense tumor, situated within and apparently forming part of a breast, should be suspected to be of a cystic nature, and when the tumor is associated with a discharge from the nipple of a clear or blood-stained serum this suspicion is much strengthened.

6. When more than one globular swelling is present, or the breast feels coarse to the hand, the gland is probably the seat of cystic degeneration or of involution cysts. When the tumor is single and there is no nipple discharge the tumor is either a chronic abscess, a serous cyst, or a hydatid.

7. When the tumor is punctured for diagnostic purposes, and the fluid withdrawn is brown, mucoid, blood-stained, or blood, the cyst is probably of duct origin; and in proportion to the amount of blood in the fluid is the diagnosis of an intracystic growth to be made.

8. When the fluid is clear and albuminous, the cyst is probably serous; when watery and free from albumin it may with confidence be pronounced to be hydatid. Under these circumstances the characteristic hooklets will be found in the fluid.

9. A slowly growing tumor, which has shown no signs of inflammation in its origin and progress, that eventually becomes the seat of inflammation as indicated by local redness, swelling, heat, and pain, may be either a suppurating hydatid tumor, or a gummatous or tuberculous inflammation of the breast.

10. A solid or cystic tumor, however large, that simply distends the integument over it and has no tendency to infiltrate it, is clearly a solid or cystic adeno-fibromatous, or adeno-sarcomatous growth.

11. A solid or cystic tumor, however small, that gives rise either to dimpling, puckering, or infiltration of the skin over it, becomes fixed to the deeper tissues and is complicated with enlargement of the axillary or clavicular lymphatic glands, is certainly a cancer.

12. A flattened or retracted nipple associated with a tumor may be a symptom of small or great significance. If not con-

genital in its origin, or due to some antecedent inflammation, the flattened condition of the nipple may be brought about by a simple stretching of the gland, the result of continued growth of a simple neoplasm, whereas the retraction of the nipple may be produced either by the contraction of a scirrhous tumor infiltrating the lobe of the breast, and dragging upon its ducts, or by the presence of some adenoid, sarcomatous, or cystic tumor in the centre of the breast, and so separating its ducts as to bring about a drawing in and retraction of their terminations.

13. A tumor that ulcerates upon its surface and becomes excavated by the extension of the necrotic ulcerating process, is most probably cancerous, and when the edges of the ulcer are raised, indurated, and everted, the diagnosis is confirmed.

14. A tumor that presents a prominent fungating mass from some parts of its surface, and this mass projects from an orifice which has punched out and not infiltrated edges, is certainly sarcomatous, and probably cystic. A slow-growing tumor which first stretches the skin and then ruptures it, and from the orifice of which thus made a colloidal or mucoid fluid escapes, is probably a colloid tumor.

15. A tumor which originated in the breast, that becomes complicated with a red or white, brawny, œdematous or tuberculated condition of skin over the growth is without doubt cancerous and of the worst type.

16. The absence of any enlargement of the axillary, or clavicular lymphatic glands with any breast tumor is an argument in favor of its benignancy, whereas the presence of such a complication suggests the reverse. Enlarged lymphatic glands may, however, be found associated with simple tumors when any local sources of irritation arise, and they may be absent for months, years, or altogether in certain examples of cancer, particularly of the atrophic variety in which the disease spreads slowly, and shows no sign of activity. In a case now under my observation of scirrhous cancer of fourteen years' standing, the lymphatic glands are uninvolved.

17. Discharge from the nipple when free is more than suggestive of a duct cyst; where the discharge is serous, of simple serous disease; where blood-stained or blood, of cystic disease complicated with intracystic growth, either of a simple or cancerous nature.

18. A slight sanguineous discharge from the nipple in the absence of nipple trouble, is suggestive of glandular cancerous disease, since simple non-cystic benign tumors never give rise to a discharge from the nipple unless associated with some degenerative cystic disease of the gland.

19. A slow-growing, almost painless, nodular, elastic tumor of the breast, over which the skin is thinly stretched before it becomes infiltrated and later on ruptured, and which discharges a tenacious mucoid fluid, more or less blood-stained, is certainly a colloid.

CHAPTER XIX.

ON MORBID CONDITIONS OF THE NIPPLE.

The surgeon should in all affections of the breast be well alive to the fact that the nipple may be congenitally deficient, small, flattened out, or not prominent as it is normally. He should remember that a naturally well-formed nipple may have become deformed, or retracted from some inflammatory condition which occurred in early life, or followed a pregnancy which took place long before the complaint for which he may have been consulted appeared. He should know, moreover, that the nipple may have been destroyed by ulceration of a simple or malignant form, or that it may have sloughed off from some inflammatory trouble. He should, likewise, have clearly in his mind the fact that a nipple may have become flattened out or retracted from the growth of a simple benign tumor or cyst situated in the centre of the gland, and he should not jump to the too common conclusion when he finds a retracted nipple associated with a neoplasm, that the new growth is a cancer. A retracted nipple when associated with certain other morbid conditions is a valuable symptom of scirrhus, whereas by itself it has no significance.

There can be little doubt that as a positive indication of cancerous disease, the importance of a retracted nipple has been considerably overrated; and that, although the symptom may be common in infiltrating cancer of the breast, such a disease may exist without it. It may be present, moreover, in simple non-cancerous affections. A retracted nipple may be regarded as an accidental symptom in the development of a tumor, and also as the product of mechanical causes; its presence being determined rather by the manner in which the gland is involved than by the nature of the disease. If any tumor, cystic or solid, simple or malignant, any abscess, chronic or acute, attack the centre of the mammary gland, a retracted nipple

in all probability will be produced; for as a disease so placed necessarily causes material separation of the gland ducts, their extremities, terminating in the nipple, will be drawn upon, and, as a consequence, a retracted nipple must follow. We thus find this symptom of frequent occurrence in the early stage of an infiltrating cancer of the organ, the nipple being always drawn toward the side of the gland which may be involved; while at a later stage, when the infiltration is more complete, the nipple may again project. In a central chronic abscess of the breast, in a case of cyst or of adeno-fibroma or sarcoma, the retracted nipple is equally common, and in the true cystic adenocele it may be also present. In the ordinary adeno-fibroma or sarcoma, whether cystic or otherwise, it is rarely met with, for the reason that this disease is not of the breast gland itself, but only situated in its neighborhood. In exceptional cases, however, such an association may coexist. In one case in which I observed it, a blow or injury had preceded the development of the adenoid tumor, and it was open to a doubt whether the retracted nipple had not been brought about by some chronic inflammatory condition. It should always be remembered, moreover, that a contracted nipple may be a natural condition.

A discharge from the nipple should always attract attention. When the discharge is slight or of a bloody nature, it does not indicate any special affection, though it is well known that in cancerous affections a discharge from the nipple is not infrequent, the fluid having the appearance of blood-colored serum, which is never profuse, and rarely amounts to more than a few drops. In the true cystic affection this symptom is of considerable value, for in the majority of the cases which have passed under my observation, as well as in the recorded examples, this discharge from the nipple was a prominent feature, the fluid being generally of a mucoid nature, and more or less blood-stained; and although at times it occurred spontaneously and with relief to the patient, at others it could readily be induced by some slight pressure upon the parts. In the ordinary solid forms of adeno-fibromata or sarcomata, this symptom is seldom present. It exists, therefore, as a symptom in the true cystic disease of the breast structure, whether cancerous or sarcomatous; and is consequently, as a means of diagnosis, of some value.

"The fluids," wrote Birkett, "which sometimes ooze from the nipple at the commencement or during the progress of a new growth, may be rendered subservient to the formation of a correct diagnostication of the nature of the disease in the part. Sanious, offensive, opaque discharge containing cells, identical with those forming growths of cancer, may be regarded as indicative that the induration which would probably accompany the exudation of such fluid arises from infiltrating carcinoma; while a bright-yellow, clear, tenacious, serous fluid, drawing out into thread-like processes, and the flow of which is perhaps increased by compression on a circumscribed collection of fluid, would guide the surgeon to an accurate opinion that the tumor depended upon the presence of an adenoid growth, or a simple cyst."[42]

Inflammation and ulceration of the nipples is a serious trouble, since it is too often the precursor of mammary abscess. It is more likely to occur in first than in later pregnancies, but if women become feeble at the second, third, or fourth pregnancy, this affection may appear, although they may have escaped the trouble on former occasions. At times the affection shows itself as an inflammation of the nipple and its areola, with all the local phenomena of inflammation or swelling, redness, heat, and pain. In a certain number of cases the inflammation will subside under treatment, and the parts recover their normal condition.

In the majority of cases some local ulceration follows, and this may show itself either as a local "fissure," "chap," or "excoriation," or as a superficial or deep ulcer. In exceptional cases the nipple may be entirely destroyed. The ulcers are generally found between the rugæ or about the base of the nipple. In the worst cases the areola is likewise involved. The ulcerated surfaces are always painful and generally bleed. When the process of suckling is attempted the pain becomes agonizing, and the hemorrhage more abundant. That the pain should be severe under these circumstances can be readily understood. With these local symptoms there is usually much constitutional disturbance.

It has been assorted that these ulcers are commonly caused by some aphthous condition of the child's mouth; I believe they may be so in some cases, but in the majority they result from some unusual sensibility of the skin of the part, and at

times from want of care. In first pregnancies the nipples should always be well looked to, and kept scrupulously clean, and if tender they should be bathed with some mild spirit lotion, or eau-de-Cologne and water, and well protected from friction of the dress by cotton wool or some glass or gutta-percha shield. These shields help to make the nipples more prominent, and at the same time consequently prepare them for their function.

Where ulceration exists, soothing applications are the most valuable, such as Peruvian balsam, castor oil, or almond oil. At times glycerin is of use, while at others it causes pain.

When sore nipples occur at the time of suckling, shields should be worn. Great care should be observed to dry the nipples after the use of shields, and never to leave the shields in the child's mouth after the suckling has been completed. The application of the glycerin of tannic acid, Richardson's styptic colloid, tincture of catechu, a solution of nitrate of silver (gr. v. to the ounce of water), or an ointment of extract of rhatany (gr. viij. to ʒ ij. of the oil of theobroma), are good applications. The summit of the nipple, whence the milk flows, should never be touched with the application. Whatever applications are used they should be washed off before the child suckles. In a few cases I have advised the use of a five-per-cent solution of cocaine before suckling, with great advantage. When cracks exist, it is a good plain for the mother to draw out the nipple by means of the old-fashioned feeding bottle before giving it to the infant, the mother's nipple being put into the central opening, and her mouth drawing the artificial one. Another ready method is the application to the nipple of the mouth of a wide-necked empty bottle that has been heated by hot water, the nipple, as the bottle cools, being pressed into the bottle and rendered prominent in a painless way. All breast pumps are to be condemned.

Eczema of the nipple and areola, or of the latter alone, is a form of dermatitis which must be recognized. It may appear as an eczema in other parts of the body, and get well by local treatment; or persist, become chronic, and eventually take on the form of what Velpeau described as "eczema rubrum," and pass into Paget's disease of the nipple, the precursor of cancer, to which attention has been already drawn.

This eczema may attack single or married women, young

or old; the more chronic variety is generally met with in the latter. It is rarely confined to the areola, but spreads to surrounding parts; it often attacks both breasts.

It is best treated by alkaline soothing applications, such as a lotion of the bicarbonate or borate of soda, five grains to the ounce, with some extract of opium, to get off the scabs, and then an ointment of zinc or lead, separate or combined, or one of soda bicarbonate, ten grains to the ounce, or of boracic acid. In the acute stage, simple lead and opium lotion is the best. Alkalies with some vegetable bitter form the best internal medicine, but tonics and alteratives are often required. The diet must always be simple, and little or no stimulants are, as a rule, required.

When the disease has spread to the end of the nipple, and reached the orifices of the ducts of the gland, it may creep into them, and it is possible that in this way epithelioma may arise; but this question has already been discussed.

Follicular abscess of the areola is by no means uncommon; it may occur alone or in association with an eczematous or other form of dermatitis; it is to be treated as any other follicular inflammation, and usually soon runs its course and gets well.

Ellen D., aged 37, the mother of four children, the youngest being eight years old, came to me in June, 1865, with suppuration of many of the follicles of the areola of her right breast. The disease had existed for eleven weeks. By the use of lead and opium lotion and tonics, recovery took place.

Sebaceous Tumors of the Areola.—These occasionally occur, and may give trouble if not recognized. I have the notes of three such cases that came under my care when outpatient surgeon at Guy's, and they all occurred in young women; they may, however, be found in women of maturer age.

The cases are as follows:

Case I.—On December 1st, 1867, Mary G., aged 32, came under my care with a well-marked sebaceous tumor in the areola of her right breast. It has been coming for months. I turned it out of its bed as a whole by pressure through an incision, and the case did well.

Case II.—On June 13th, 1863, Susan D., aged 42, applied to

me at Guy's Hospital, for a tumor hanging from the areola of the left nipple. It was pedunculated, and the size of a small nut. It had existed for three and a half years. When removed it turned out to be of a sebaceous kind.

Case III.—Mary C., a married woman, aged 22, came to me on March 5th, 1863, with a sebaceous tumor, the size of a nut, above and in contact with the nipple, which had been growing for five months. It had commenced during suckling. I removed the growth by turning it out of its bed. It was clearly sebaceous.

Case IV.—Charlotte S., aged 24, the mother of one child, consulted me on May 30th, 1867, for an ulcerating sebaceous tumor on the margin of the areola of the right breast, which she had observed ten weeks. I enucleated the tumor, and the patient rapidly recovered.

These tumors may become the seat of cancer. I remember an example of epithelial cancer of the areola of a breast of a middle-aged woman, which followed a tumor which had existed for years, and broke down. I believed the case at the time to have been one of fungating sebaceous cyst; the interior of the cyst on its being emptied having become the seat of epithelial cancer in the same way as is well-known "wens" upon the head or sebaceous cysts on other parts of the body occasionally do.

Growths upon the Nipple and Areola.—Warty, papillary, pedunculated, fibro-cellular, or other growths may be found upon the nipple, which will be recognized by their ordinary appearances. I have seen many such, and give the particulars of two of the cases, the notes of which I have preserved.

These growths should always be removed. In the Guy's museum there is preparation (2,300[60]) of a pedunculated papillomatous growth, the size of a nut, which was attached to the nipple of a woman, aged 48 (Fig. 13). It had been growing for twenty-six years, and during that time she had had ten children, all of whom she had suckled. Mr. Howse removed it.

Case I.—Pedunculated fibro-cellular growth on the apex of the nipple the size of a nut.

This was met with in the person of Annie S., aged 27, a single woman, about to be married, who came to me in May,

1864. It had been growing two years, and was clearly of the softer kind of fibro-cellular growths. I removed the growth with a pair of scissors, and a good result followed.

Case II.—Pedunculated growth the size of half a nipple growing from the lower border of the areola of the nipple.

Susan D., aged 42, came before me on June 18th, 1863, with a pedunculated growth connected with the areola of her left breast, three-quarters of an inch long. It was firm to the touch, and apparently fibrous in texture. It had been growing for four years. She would not have it removed.

In the museum of the College of Surgeons (Prep. 4,819[A]) there is a specimen of a pedunculated papillary tumor, nearly

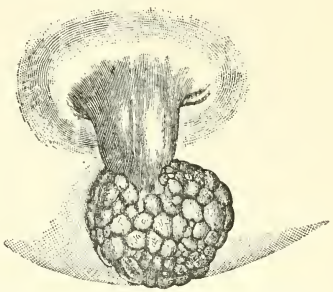


Fig. 13.—Pedunculated Papilloma of the Nipple.

one inch and a half in length, which is smooth, firm, and lobulated. Microscopically the growth was composed of overgrown fibrous tissue; but sections taken at its attachment showed an ingrowth of small well-defined epithelium, not like those of epithelioma. The growth was removed by Mr. J. Hutchinson from a woman aged 38.

In the same museum there is likewise a preparation presented by myself of an extremely atrophied breast only two and a half inches in diameter, of which the nipple is enlarged by a growth of dense fibrous tissue, both within and beneath it, and is pyramidal in shape. The other parts of the gland are of firm fibrous texture, but are less dense than the nipple. With the microscope, only fibrous tissue and a few compressed

atrophied ducts, and no cancerous growth, could be found. It was removed from an elderly lady.

Chancre of the nipple is an affection which must not be left out of mind when the surgeon is consulted for an ulcer of the part. I have seen several examples of the kind, with the most typical chancres, infecting and non-infecting. A chancre upon this tissue presents much the same local appearance as upon the external part of the male prepuce. It is to be treated in the same way.

The subject is mentioned here in order that the student and practitioner may be reminded of the possibility of the nipple being the seat of primary syphilis, the mere recollection of which renders the accurate diagnosis of a case more probable.

CHAPTER XX.

ON THE PRESENCE OF MORE THAN ONE NEOPLASM IN THE SAME SUBJECT, AND ON THE SHRINKAGE OF TUMORS.

It is not common to find in the same subject more than one kind of neoplasm, or to meet with cases of cancer having apparently more than one centre. I have, however, the notes of a few such cases, in which the breast, with other parts, has been involved. I quote them simply as curiosities, and as material for future study, and not as texts for speculative opinions.

The first case is a very remarkable one:

Case I.—Rapidly growing sarcoma of right breast, associated with atrophic scirrhus of the left breast of twenty years' growth, and lipoma of the side; recurrence of sarcoma, and repeated operations, in a lady, now 68 years of age.

Mrs. T., aged 64, a very healthy-looking woman, consulted me in 1882 for an ovoid, smooth, semi-elastic tumor, the size of a cocoanut, which occupied the position of her right breast. She was the mother of three children, all of whom she nursed with the left breast, but not with the right, as it was hard and gave no milk. The tumor had been growing for about eight months, slowly at first, but rapidly for the last three months. The breast was lost in the tumor; and the skin and nipple, though healthy, were stretched; there was no enlargement of the axillary glands. The tumor was fleshy and elastic, with a smooth outline. It moved with the breast upon the parts beneath. I regarded it as a sarcoma. In the left, or opposite breast, was a typical atrophic carcinomatous tumor, which had existed for sixteen years. The breast was contracted up into a stony mass; the skin over it was puckered, but not infiltrated, and was adherent to the breast gland; the nipple had retracted deeply into the breast. The left axillary glands

were not found to be enlarged. The carcinomatous tumor gave no trouble, nor was it the seat of pain.

Over the left hip there was a lipoma, the size of a fist, of twenty-five years' growth. This was disregarded by the patient.

On January 9th, 1883, I removed the tumor with the right breast. The tumor was succulent, and on section showed a homogeneous structure; a glairy fluid exuded from its surface, which was of a pinkish-gray color. Under the microscope the tumor was made up of spindle and round cells, with but little fibre tissue.

The case did well after the operation, but a return in the neighborhood of the scar soon took place, for which another operation was demanded. This in its turn was followed by a speedy convalescence, and again by the return of the growth. Up to the present time, July, 1887, four and a half years after the first operation, sixteen operations have been performed, and the patient's general condition is excellent. Repair follows each operation in a most satisfactory way, and beyond the necessary trouble connected with an operation, the general health of the patient suffers in no way. Neither the carcinoma of the breast nor the lipoma has made any progress.

The dates of the sixteen subsequent operations are as follows: July 19th, Oct. 24th, 1883; April 2d, July 2d, Oct. 8th, 1884; Jan. 16th, June 20th, August 13th, Oct. 29th, 1885; Feb. 10th, April 28th, July 17th, Oct. 9th, 1886; Feb. 9th, April 13th, July 6th, 1887. Sometimes one growth has been removed, at others several. Every growth has had a delicate capsule, and each one has been readily enucleated. Some have been in the fatty tissue of the part, others have been in muscle; some have been in glands.

The specimen removed on April 2d, 1884, was examined by Dr. Goodhart, who reported the "growth is a mixed sarcoma, chiefly a spindle-cell sarcoma, but there are some myxoma-like cells in several places."

Mr. Symonds examined the tumor removed on July 2d, 1884, and reported as follows:

"The tumor was oval, measuring $1\frac{1}{2}$ in. by $\frac{3}{4}$ in., perfectly smooth in outline, and covered by a thin capsule. No breast or other tissue was attached to it. It was soft and elastic, of a gray color, and showed an almost uniformly homogeneous

section. It could easily be broken down by pressure, but at two points was somewhat more resistant. The surface when scraped yielded a thin gelatinous fluid, containing cells of various shapes, the majority were oval, with several nuclei, and many were spindle-shaped. The nucleus of the latter closely resembled the former cell. There were also a few round cells.

Microscopically the harder parts showed interlacing tracts of spindle-cells, cut in various places, giving the alveolated appearance common to such tumors. The vessels were numerous, the arteries having well-defined walls, while the veins appeared as spaces in the tissue, and being in places collected in groups, gave a cavernous aspect to this part of the section. In the softer parts the vessels were more numerous but smaller, the cells also smaller and more of them round, the whole having the appearance of granulation tissue. The typical cell was a spindle, with a large oval granular nucleus. The spaces referred to above as venous were of various shapes, and suggested, from their arrangement, that they communicated. Their walls were very thin, and showed elongated nuclei in a small amount of imperfect fibrous tissue, but, as stated above, appeared more as spaces in the growth. Though this is the common structure of veins in new growths, the arrangement in groups or plexuses seemed to call for special mention, as the spaces might be mistaken for cysts. Their resemblance to the singly placed apertures, and the absence of any epithelial lining, confirms the interpretation here given.

Mr. Eve, of the College of Surgeons, examined the tumor removed on February 10th, 1886, and reported that it consists entirely of round cells in mucous tissue. "Probably," he adds, "the original growth belonged to the class of tumors formerly known as recurrent fibroids. The elements get more elemental with each recurrence as a rule." In this matter Mr. Eve is doubtless correct.

It is a point of great interest to find in a woman, now 68 years of age, a most active growing and recurring sarcoma, side by side with an indolent atrophic carcinoma, and with her general health perfect. It is likewise worthy of note that in this case, as in Cases II. and XXIV., recorded in the chapter on cystic sarcoma, the disease attacked glands that had failed to secrete milk.

Case II.—Carcinoma of the breast, one year; lipomata of groins thirty years.

Caroline B., aged 57, the mother of one child, came to me on February 21st, 1867, with a scirrhous infiltration of her right breast and adherent skin over the tumor, which was fixed to the parts beneath. The axillary lymphatic glands were likewise enlarged. The disease had been discovered one year. Two large pendulous lipomata, the size of cocoanuts, also existed in the groins, which had been growing for thirty years.

Case III.—Carcinoma associated with an adeno-fibroma of the right breast; amputation of breast.

Eliza C., a single woman, aged 49, came under my care in May, 1885, with a tumor in her right breast, which had been growing for about three years. When seen the lower and axillary lobes of the right breast were evidently infiltrated with some new material, and the swelling formed a tumor three inches in diameter. It was hard and nodular to the touch, and moved with the breast upon the parts beneath. The nipple was natural, skin dimpled; the axillary glands were not felt to be enlarged.

On June 6th the breast was removed, and on exploring the axilla some lymphatic glands were found enlarged and taken away. The patient did well, and left the hospital in one month.

On making a section of the tumor, one-third of the gland was the seat of a true scirrhus, and the gland tissue about it was the subject of cystic degeneration. Between the cancerous tumor and the nipple, and upon the surface of the gland, there was a second tumor, the size of a nut, which was encapsuled, and on section presented a coarse lobulated surface, and to the eye and microscope yielded the appearance of an adeno-fibroma. In the Museum of the College of Surgeons a specimen of a like kind has been placed by Mr. J. Hutchinson.

Case IV.—Carcinoma of the breast following epithelioma of the nose.

Jane B., aged 63, a childless married woman, came under my care in 1861, with epithelial cancer of one nostril. This I removed, and a good recovery took place. Five years later, that is on June 25th, 1866, when she was 68 years of age, she came to me with a hard infiltrating carcinoma of her right breast, associated with a puckering of the skin over the breast, which had been coming for eight months. The disease pro-

gressed very slowly; one year later tubercles appeared in the skin over the breast, and the axillary glands became enlarged; six months later the arm was œdematous, and she died toward the end of 1868.

Case V.—Carcinoma of the breast of twenty-five years' growth, followed by epithelial cancer of the nose.

Frances H., a widow, aged 72, with one child, came to me on July 1st, 1865, with a marked example of atrophic carcinoma of her right breast of twenty years' standing, which had been ulcerating for seven years.

In February, 1871, that is, six years later, when she was 78 years of age, she came to me again with a marked epithelial cancer of one of her nostrils. The breast trouble, which had then existed for twenty-six years, had altered but little.

Case VI.—Infiltrating carcinoma of breast, and ulceration of the nipple; preceded by discharge from nipple associated with cancerous stricture of the œsophagus.

Mrs. G., a thin feeble woman, aged 60, came under my care on February 25th, 1885, with a central hard tumor infiltrating the whole of the left breast, and a raw red ulcer occupying the position of the areola and nipple, and enlarged axillary and lymphatic glands. The nipple had entirely disappeared by ulceration. She was the mother of two children, the youngest being 25, both of whom she suckled without trouble. For eight or nine years previously she had had a watery discharge from the nipple, and nine months later the discharge was bloody. Two years ago the nipple became sore, and this soreness spread; about this time a lump appeared in the centre of the breast.

As the soreness of the nipple spread, the nipple steadily disappeared, and the tumor of the breast increased.

For five years she had had steadily increasing difficulty in deglutition, and for some months had only been able to take milk with sopped bread. The smallest size bougie can be passed through a strictured œsophagus.

As no active treatment was possible, I did not see this patient again.

Case VII.—Lymph-adenoma of cervical glands, followed by acute brawny cancer of the breast, and subsidence of the swelling in the lymphatic glands.

Sarah B., aged 49, a childless married woman, came under

my care in 1875, with enormous enlargement of the lymphatic glands in both sides of her neck, and behind and beneath the jaw. The swellings were composed of tumors the size of eggs, which could be moved about beneath the skin. These glandular swellings had been gradually coming for fifteen years. The woman was feeble and leucæmic.

Four years later this woman came to me again with a brawny carcinoma of her left breast, which had commenced four years before as a small lump, which grew slowly, and steadily involved the gland as a whole. When seen, the breast was generally infiltrated and hard. The skin covering it was adherent to the breast and felt like brawn; it had, moreover, in different parts many distinct indurated cancerous tubercles. The lymphatic axillary glands were enlarged.

Oddly enough, however, from the first appearance of her breast trouble, the cervical lymph-adenoma steadily subsided, so that when coming under observation but very slight enlargement of the glands could be made out.

The woman had a red complexion and a watery eye, but her urine was natural. Her powers were feeble, and I learned later on that she sank from what was supposed to be internal cancer.

The association of these two diseases is very interesting, and the fact that the lymph-adenoma diminished as the carcinoma increased is remarable.

On March 6th, 1874, I was present when my colleague, Mr. Durham, removed from the buttock of a woman, aged 65, an epithelial cancer the size of a florin, from whom Mr. Hilton had excised, twenty-three years previously, the right breast for cancer, and the scar was then a good one.

On the same day Dr. S. K. Fowle, of New York, who was visiting London, told me that in 1858 he saw the late Dr. Gross remove from the cicatrix of an operation in the breast of an old woman a carcinomatous tumor, the size of a walnut, of one year's growth; Sir A. Cooper having excised the woman's breast thirty years before for cancer.

I would also here draw attention to the case of colloid tumor of the breast, published at page 198, in which the removal of a colloid growth in the breast was, eight years later, followed by a typical scirrhous carcinoma of the opposite breast.

Case VIII.—Carcinoma of the left breast; excision; return in the scar nine years later; four years after removal of breast, the appearance of a melanotic sarcoma in a mole situated in the left axilla; excision and no return; uterine cancer eight years after the removal of the breast; and carcinoma of the left femur, fracture of bone, and death nine years after removal of the breast.

Mrs. K., aged 50, the mother of seven children, all of whom she had suckled without difficulty, the youngest being sixteen years of age, consulted me in May, 1876, with an infiltrating carcinoma of her left breast, which had been slowly growing for two years. The nipple was retracted, and the skin about the nipple infiltrated. No axillary glands were enlarged.

On May 3d, 1876, the breast was removed, and a rapid recovery followed. The axilla was not explored, as nothing could be felt through the thin integument. Four years after the operation in her breast, a mole, which had existed in her left axilla, on the side from which the carcinoma had been removed, became the seat of a melanotic sarcoma. After six months' growth, when it had attained the size of a nut, I took this away and no return took place.

In 1884, eight years after the operation on her breast, the neck of the uterus became the seat of cancer; the disease appeared as a nodule the size of a hazelnut, and from this there was at times free bleeding.

About this time the left arm became œdematous and painful. In December of 1884 she complained of pain and stiffness in the upper part of her left thigh, which soon became swollen, and before many weeks had passed it was evident that the upper part of the femur was enlarged. In June, 1885, some carcinomatous tubercles appeared in the scar of the breast operation, and when getting into bed she felt something give way in her thigh, and heard a crack. Dr. Curgenven, her medical man, saw her, and discovered a fracture at the seat of the swelling, and there can be no doubt as to the swelling being a cancerous tumor.

From this time she steadily sank, and died in August, 1885, nine years after the removal of a carcinoma of the breast, and five years after the excision of a melanotic sarcoma of the axilla.

Case IX.—Melanotic sarcoma originating in a mole situ-

ated in the right axilla, followed in four years by an infiltrating carcinoma of the right breast.

Mary P., aged 40, a single healthy woman, came to me in April, 1872, with an ulcerating melanotic sarcomatous growth, the size of an orange, which had originated two years previously in a mole in the right axilla. No enlarged lymphatic glands were to be felt. On April 25th I excised the growth, and a good recovery followed. The patient remained well for nearly four years, when the breast of the same side became painful and enlarged, and six months later, when she came to me for advice, the breast was evidently the seat of an infiltrating carcinoma. The scar of the operation for melanotic sarcoma was sound, and no signs of recurrence were present. In July, 1876, I removed her breast, which on section was clearly of a carcinomatous nature, and a good recovery ensued. In 1884, eight years after the removal of her breast, and twelve years after the excision of the sarcoma, this patient was known to be quite well.

Shrinkage of Tumors.—Adeno-sarcomatous and fibromatous tumors, in very exceptional occasions, diminish in size by time. I have certainly seen two examples of the kind and am disposed to think that the diminution in the size of the growth is to be explained by the absorption of such fluid as might have filled the growth or its capsule, rather than to any true shrinking of the neoplasm itself. Explain the matter how we will, the fact must, however, be recognized.

The cases are as follows:

Case X.—Adenomata in the breast of a suckling woman, which diminished in size subsequently.

Eliza F., aged 22, a married woman, pregnant four months, came to me on March 15th, 1868, with an adenomatous tumor, the size of half a cocoanut, in the axillary border of her left breast, and a second the size of an orange in the sternal border of the same gland. The two had been growing steadily for two years. During the progress of the pregnancy both these tumors grew rapidly, and became at last twice the size they were.

On September 30th she was confined, and suckled with her right, or unaffected breast, for three months. The tumors in the

left still grew. After weaning they, however, steadily diminished, so that on January 3d, 1870, that is, twelve months later, they had returned to the size described when seen in March, 1868.

It should be added that this patient's single sister, when 21 years of age, came to me in June, 1870, with great enlargement of her left breast, from supposed hypertrophy. The gland was twice the size of the right breast.

Case XI.—Adenoma of the breast of eighteen years' growth diminished by time.

Margaret K., aged 41, a single woman, came under my care on July 3d, 1873, with a tumor in her left breast of eighteen years' standing, which was the size of an egg, soft, lobulated, and movable in and with the breast. It was quite painless. Eight years previously the tumor had been more than twice its present size. It had grown steadily for two years, when growth stopped and changed into shrinkage.

CHAPTER XXI.

NÆVI AND VASCULAR TUMORS OF THE BREAST—LIPOMATA AND CHONDROMATA OF BREAST.

Nævi are found in the skin covering the breast, in the same way as they are found in other parts of the body. In rare cases they may be found upon the nipple. I saw an example of this many years ago in a female child, who had a red, raised, florid nævus, the size of a shilling, situated upon the breast and half the nipple. I destroyed it by means of the galvanic cautery, after two or three applications.

Conrad Langenbeck has recorded cases of nævi which have extended from the skin to the breast beneath. Such cases in infants must be difficult to diagnose, since the breast as a gland is but rudimentary, and even when the nævus involves the deeper tissues, it may be a question as to how far the breast may be involved.

That the breast may be the seat of true nævoid disease there is no doubt, although such cases must be rare. I cannot find any examples recorded, beyond the one I have briefly alluded to in my work on the practice of surgery. In that case the breast, with the skin over it, was one vascular half globe. It was spongy to the hand, and could be emptied by pressure and easily refilled. The nipple was apparently retracted, but this condition was brought about by the elevation of the parts about it. The notes of the case as taken at that time are as follows:

Case I.—Nævus involving the whole of the breast.

Mary R., fifteen weeks old, was brought to me at Guy's Hospital on October 14th, 1869, with a nævus involving the whole of the breast gland and skin over it; the nipple was retracted. The tumor measured two inches in diameter, and was like half a globe; it was spongy to the feel and prominent. Large veins converged toward its surface and through the skin. At

the margin of the gland the purple substance of the nævoid structure was visible. The whole swelling could easily be reduced by pressure, and on the removal of which the swelling returned. No treatment was adopted.

Lipomata of the Breast.—That lipomatous tumors may be found in the integument that covers the breast, that is, in the paramammary tissue, the experience of most surgeons will prove, although it is not so clear that they are met with within the gland structure or behind it. Gross says, "I am not aware of a single case of circumscribed lipoma occurring in the gland itself," and if he means by this a fatty tumor unconnected with the surrounding fatty tissue he is probably right, and his experience most certainly coincides with my own.

Sir A. Cooper, in 1805, removed the breast of a woman which measured in circumference thirty-one inches, with a large lipomatous tumor, which was subsequently found to be situated behind the gland, and to have weighed 14 lbs. 10 oz.

He also removed from a woman who had a breast of great size, by a single incision, masses of fatty tissue from between the different portions of the gland which was itself healthy. "The lobes of fat which are interspersed between the different portions of the mammary gland, and which serve naturally to augment the size of the bosom, having become enlarged and formed a swelling, which, prior to the incision being made, seemed to involve the whole of the breast; but when the operation was performed, the different lobes of adeps which formed the tumor could be drawn away from the gland itself."

In the Guy's Hospital Museum (Prep. 2300[50]) there is preserved "a large adipose tumor, which measured 23 inches in circumference, and was removed after death from the breast of a married but sterile old woman, aged 87. When 30 years of age she observed the tumor in the upper part of the right breast, and this she showed to Sir A. Cooper on January 9th, 1806. She remembered the date, because it was the day on which Lord Nelson was buried. The growth slowly enlarged, but not during the last few years. It was thought to have been an adenocele, but when a section was made it was found to consist of fat, with a piece of bone in the centre." Fig. 1 on Plate IV. was taken from this patient during life.

A lipomatous tumor may, however, be developed in the tissue covering the breast or elsewhere. The following is an example of the affection:

Case I.—Lipoma the size of half an orange over the breast; excision; cure.

Annie B., aged 50, came under my care on September 5th, 1883. She had had four children, the youngest being eleven years old. Five years ago she noticed a lump in the upper part of her left breast, which has steadily increased. When seen the lump was the size of half an orange, and measured three by two and a half inches. It was placed over the clavicular lobes of the left breast, and was movable over the gland. It was clearly lobulated and apparently fatty. On September 7th I excised it and found it to be a pure lipoma. The case did well.

Chondromata.—These growths are rarely met with in the breast. Sir A. Cooper gives one case, with a drawing, in his work on the breast; he removed it from a healthy woman, aged 32, and it was of fourteen years' growth. The pain in it was very severe, and the tumor was excessively hard. He removed the growth, and the larger portion of it had the appearance of that cartilage which supplies the place of bone in young subjects. The remaining portion was ossific. Fig. 2 on Plate IV. illustrates the case.

Professors J. Müller, Rindfleisch, and Billroth, record other cases in which nodules of cartilage were found in the breast. In the Guy's Museum, Prep. 2316^{50}, there is a tumor which was taken from the breast of a middle-aged woman. It was examined by Dr. Wilks, who pronounced it to be fibro-cartilaginous.

In vol. xxxiii. of the Pathological Society's Transactions of London (p. 306), Mr. Bowlby reports a case of chondro-sarcoma of the breast, of one year's growth, taken from a woman, aged 42. The breast with the tumor, which was encapsuled, was removed, but a return took place which proved fatal within six months of the operation.

Cruveilhier has also described a case in vol. iii. of his "Anatomie Pathologique," but Mr. Bowlby throws some doubt about its true nature. Upon the whole, although it must be accepted as a fact that the disease may occur in the

breast, it is certainly very rare. It may occur as an innocent growth or in association with a malignant one.

On May 18th, 1886, Mr. W. H. Battle showed the members of the London Pathological Society a specimen of osteo-chondrosarcoma of the breast, which is very rare.

It was taken from the right breast of a widow, aged 73, who had had five children. The tumor commenced as a hard lump, to the inner side of the nipple, six years before. The growth was painless, and the patient's general health unaffected. It grew slowly until, within a year of its removal, it had attained the size of a large orange; it consisted of two portions, an inner, very hard and rounded, about the size of a walnut, which the patient had noticed for a long time; and an outer, a more recent development, more elastic, of the size of a large egg. The nipple was much retracted. The skin was adherent, red, and tense at the inner part. One small freely-movable gland was detected in the axilla. The growth consisted of a large portion composed of a soft, friable, extremely vascular material in which there had been numerous hemorrhages; and of a smaller very hard portion which resembled bone, and could not be cut with a knife. Microscopic examination of the tumor showed it to consist, in the softer parts, of round and spindle cells; and in the harder, of cartilage which had in parts become ossified, the section showing well-marked Haversian canals.

CHAPTER XXII.

TUMORS OF THE MALE BREAST.

THE male breast is liable to the same affections as the female, but in a far lesser degree; the male gland at no period of its life being called upon to show any functional activity.

It may, in infancy, be as frequently the seat of inflammation as the female gland, and in a former chapter it has been shown to be liable about puberty to a marked growth, and to a spurious functional activity, which may lead up to inflammation. It may also, as a result of injury, be the seat of abscess.

Fibromata, sarcomata, and adenomata have been met with in the gland, and carcinomatous tumors are not rare. Thus Mr. W. R. Williams reports that out of about 280 examples of adenomata of the breast, consecutively noticed in London hospitals, one was in a male; of 68 examples of sarcomata of the breast, two were in males; and of 1,433 cases of cancer of the breast, fourteen were in males; or roughly speaking, that one case of benign tumor of the breast is met with in the male to 116 in the female; and one case of carcinoma in the male to 102 in the female; carcinoma in the female being at least a hundred times as common.

These averages are doubtless quite reliable, since they have been calculated from the combined experience of four large London hospitals, during ten, twelve, and seventeen years. They differ from smaller statistics published by Sir J. Paget, who believes that two cases of scirrhus of the breast occur in men to 98 in women; by Gross, who has seen two examples in males to 100 in females; by Billroth, who gives seven cases in males out of 252 cases; or taking all these cases together, in the proportion of one to forty-two.

Wagstaffe gives, in vol. xxvii. of the Pathological Society's Transactions (p. 246), a table of sixty-one cases of cancer of

the breast in the male, collected from all sources, from which we learn that in only six of the whole number the disease appeared under the age of 40; in twenty it appeared between the ages of 40 and 60; in seven between the ages of 60 and 70; and in seven in subjects over 70 years of age. The disease has evidently a tendency to occur in old rather than in middle-aged men.

The diagnosis of these cases of neoplasm in the male, as well as their treatment, is to be determined by the same symptoms, signs, and conditions, as those of the female.

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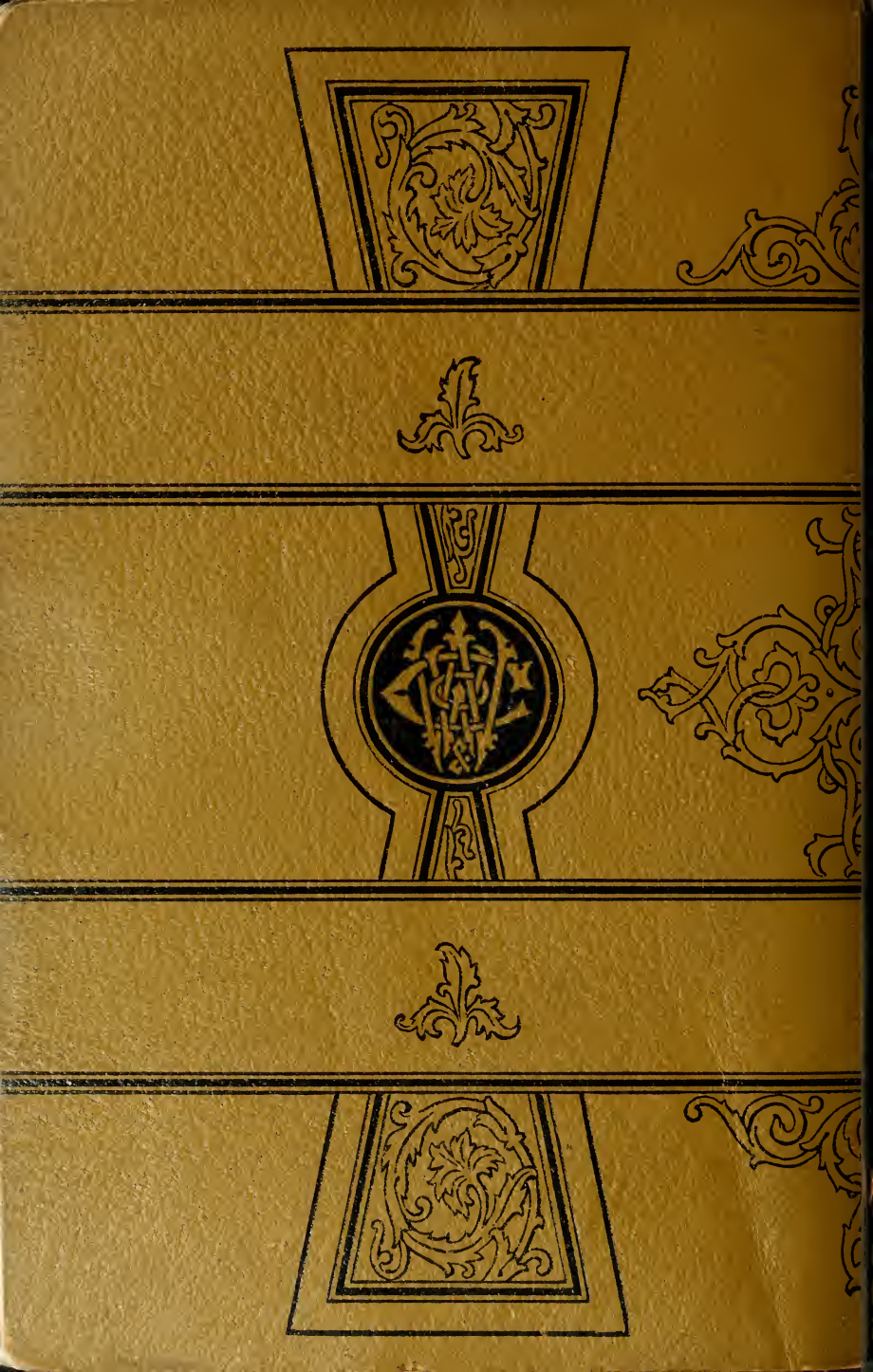
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